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THE CORRELATION BETWEEN INTERPRETATION AND PRODUCTION OF SPEECH SOUNDS

Summary

The main object of the article is to show the close agreement between the peak value mechanism assumed to be present in the auditory organ and the data which can be deduced from a sound producing device like the vocal tract with the vocal cords. This strengthens the hypothesis regarding this peak value mechanism. As a result of the investigation of the relevant properties of the vocal tract it becomes clear i.a. why between certain rather wide limits differences of the resonators in shape, volume and opening are acoustically irrelevant.

1. INTRODUCTION

In our Lingua-article of 1954 [1] we have put forward the hypothesis that after having gone through a process of demasking in the cochlea the speech sounds are identified by the nerve cells of the basilar membrane which function as peak value meters. At the time we considered this, an attractive supposition without, however, completely excluding the possibility of other hypotheses.[2] At present we believe that our hypothesis concerning the measuring of peak values has considerably increased in probability. This is because it appears that by means of this method the ear determines the very data which can be acoustically measured from a sound producing device like the vocal tract (with the vocal cords). In other words, the action of the auditory organ we assumed proves to harmonize with the nature of the sound producing mechanism. In itself this harmony need not surprise us. Even after the recent differently directed investigations by Dunn,[3] the difficulty remained, however, how this harmony between the articulatory aspect and the interpretative, perceptive aspect of the speech sounds had to be understood.

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1) The analysis of the phoneme in distinctive features and the process of hearing, Lingua IV, 2 (1954), p. 167–193.

2) idem, p. 179.

3) H. K. Dunn, The calculation of vowel resonances, and an electrical vocal tract, JASA 22, 6 (1950), p. 740–753.

2. THE VOCAL TRACT AS AN ACOUSTICAL DEVICE

In order to get an idea of the data, that may be acoustically deduced from a complex system of resonators like the vocal tract put into action by air-puffs via the vocal cords, we will start by first discussing a very simple acoustical device i.e. an ordinary bottle.

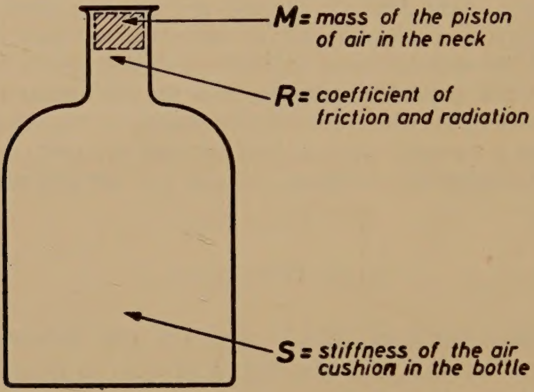
M= mass of the piston of air in the neck
R= coefficient of friction and radiation
S= stiffness of the air cushion in the bottle

Fig. 1. Simple resonator.

The air in this very simple resonator may be considered as an air-cushion which can be compressed or rarefied, in others words it can be considered as a stiffness.[4] The air in the neck of the bottle can be considered as a lumped mass, which moves up and down in the neck like a piston. During its movement in the narrow neck the piston of air is subject to friction. Consequently it loses energy in the form of heat-dissipation. It equally loses energy by radiating energy into space.

The acoustic behaviour of this bottle-shaped resonator may be completely described in terms of only three quantities, to wit:

S, the stiffness of the air-cushion in the bottle [5]

M, the mass of the piston of air in the neck of the bottle

R, the coefficient of friction and radiation.

If, armed with the knowledge that it is dealing with a resonator of the type described above, the ear should wish to determine the acoustic behaviour of this simple resonator, i.e. if it should wish to determine the values of S, M and R, one might imagine this happening as follows: the resonator might be given an acoustic disturbance, e.g. a short shock known to the ear; next, the ear should have to determine the quantities S, M and R from the acoustic reaction that takes place.

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[4] For the discussion of our problem mass-effects may be neglected.

[5] For a physical-mathematical description of these three quantities see par. 1 of the appendix.

Now we assume that the excitation of the resonator occurs by opening an inlet T close to the bottom of the bottle and injecting there a short air-puff. The opening T is closed after the cessation of the puff.

The injection of this disturbance results in an oscillation of the piston in the neck of the bottle. The piston starts to bounce up and down on the air-cushion in the bottle. The oscillation dies down gradually because the energy introduced into the bottle by the air-puff is consumed by heat and radiation. This type of vibration is called a damped oscillation (fig. 3).

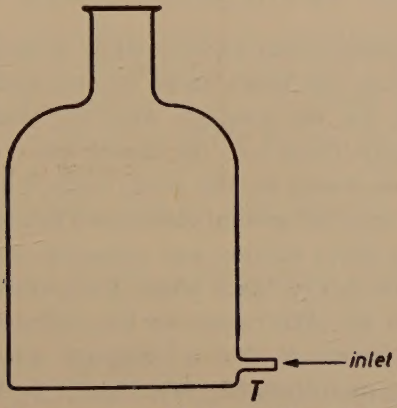

Fig. 2. Simple resonator with throat-like inlet of air puffs.

Like we already mentioned in the preceding lines, the ear has to know the exciting shock in order to be able to determine S, M and R. This shock is physically characterized by the fact that during the short time Δt an air-stream with a velocity J_0[6]) is admitted through the hole T. If Δt and J_0 are not known, the ear — even assuming that it were capable of performing mathematical calculations — could never acquire the three equations necessary for determining the three unknown quantities S, M and R.

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[6]) Concerning J_0, see note 24.

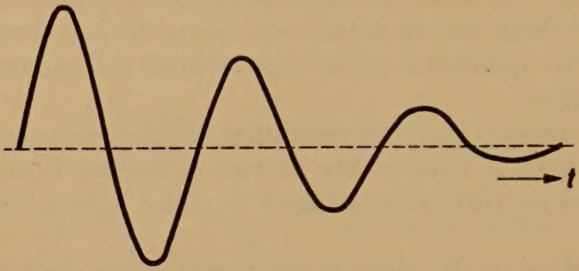

Fig. 3. A damped oscillation.

These simple considerations already allow us to draw an important conclusion concerning the much more complicated resonator-system of the vocal tract, for the analogy with the human vocal tract is obvious. The air-puffs flung into the cavity via the opening T represent the air-puffs produced by the vocal cords.[7] However, the vocal tract contains not one, but several resonators formed by constrictions, cavities and places where friction and radiation occur, in other words where dissipation of energy takes place. Each construction is characterized by its mass M, each cavity by its stiffness S and each dissipation by its coefficient R. For a complete acoustic identification of the tract all these quantities M_1, M_2, M_3 etc, S_1, S_2, S_3 etc, R_1, R_2, R_3 etc should have to be measured or determined by the ear, but we cannot expect the ear to do that, because it does not know the configuration of the vocal tract and consequently it *does not know the mathematical equation* which describes the reaction of the tract to the puff-like excitation of the vocal cords. And like we remarked already, even the nature of this excitation is concealed to the ear.

In the following we shall try to demonstrate that the hearing mechanism can only measure, one or at best two relations between the three unknown quantities S, M and R, even in the case of a very much simplified vocal tract consisting of only one bottle-like cavity.

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[7] The fact, that the vocal cords produce a series of puffs instead of only one, does not affect our argument.

3. THE RELATIONS BETWEEN THE ACOUSTICALLY RELEVANT PROPERTIES OF THE TRACT

For a further discussion of the nature of these relations we have to go back to fig. 2. As stated above, the piston reacts by performing a damped oscillation when an impulse (velocity J_0, duration Δt) is injected through T. If we consider the velocity i of the piston as representative for the description of the sound-waves emitted into space, we can establish the following mathematical relation [8]:

$$i = i_0 \, \varepsilon^{-a.t} \sin b.t \tag{1}$$

This formula can be considered as consisting of two parts: the expression $i_0 \sin b.t$ and the expression $\varepsilon^{-a.t}$. The first expression $i_0 \sin b.t$ is a description of a stationary sinusoidal vibration where i_0 = the amplitude, b = the angular frequency, t = time. The second expression $\varepsilon^{-a.t}$ is the description of a gradually diminishing amplitude-factor where ε = the base of the natural logarithm [9]), a = the damping constant, t = time. When $t = 0$, then $\varepsilon^{-a.t} = 1$; when $t = \infty$, then $\varepsilon^{-a.t} = 0$; this means that by that time the vibration has died down to zero.

For the quantities a, b and i_0 used above we have the following equations:

$$a = \frac{R}{2M} \tag{2}$$

$$b = \sqrt{\frac{S}{M} - \frac{R^2}{4M^2}} \tag{3}$$

$$i_0 = \frac{J_0 \, \Delta t.S}{b.M} \tag{4}$$

One could say that the quantities a, b and i_0 introduced in equation

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[8]) See further the appendix, esp. par. 2.

[9]) The mathematical expressions which describe the physics of sound vibrations repeatedly contain powers not of 10, like in the usual Brigg-logarithms, but of ε, the base of the so-called natural logarithms which is described by the formula: $\varepsilon = \lim_{y \to \infty} \left(1 + \frac{1}{y}\right)^y = 2.718\ldots$

(1) are nothing but simple notations for slightly more complex functions of R, S and M.

If we now look at these four equations with regard to the possibilities of the hearing mechanism for determining the quantities S, M and R we can state:

1. Equation (4) shows already that for the ear the determination of i_0 would be valueless. For the determination of i_0 would not bring the ear any closer to the determination of the quantities S, M and R, because this equation contains the elements J_0 and Δt which are unknown to the ear.

2. If the auditory organ were to attempt to determine a and b from equation (1), this would be theoretically possible by measuring i at three different moments, t_1, t_2 and t_3, chosen at random so that we have:

$$i_1 = i_0 \ \varepsilon^{-at_1} \sin b.t_1 \tag{5}$$

$$i_2 = i_0 \ \varepsilon^{-at_2} \sin b.t_2 \tag{6}$$

$$i_3 = i_0 \ \varepsilon^{-at_3} \sin b.t_3 \tag{7}$$

In order to eliminate i_0 we must take the following ratios:

$$\frac{i_1}{i_2} = \varepsilon^{-a(t_1-t_2)} \frac{\sin b.t_1}{\sin b.t_2} \tag{8}$$

and

$$\frac{i_2}{i_3} = \varepsilon^{-a(t_2-t_3)} \frac{\sin b.t_2}{\sin b.t_3} \tag{9}$$

Formally speaking, when i_1, i_2 and i_3 are known, it is possible to calculate a and b from these two equations. But apart from the fact that the ear must "know" equation (1) and that it must have means to measure (and memorize!) i_1, i_2 and i_3, it also needs a clock in order to know the times t_1, t_2 and t_3. Furthermore, the ear must have built-in tables for logarithms and sines, a calculating machine that can divide, substract, multiply etc. etc.

Now we must bear in mind that in the psycho-physiology of the senses we must not think in terms of mathematical methods, but in terms of mechanisms. It is unjustified and unrealistic to endow the ear and the brain with faculties to perform calculations and measurements which we undertake at our desks using logarithms, Fouriertransformations and the like. Experimental evidence makes it likely that the hearing mechanism contains nerve-elements that are of a surprisingly simple nature.[10] It is therefore highly improbable that the ear would perform the laborious operation of determining a and b simultaneously from (1) by means of the complicated mathematical process indicated above.

3. It is clear that after what has been said sub 1 and 2, only the equations (2) and (3) remain for the ear as possible sources of information about the quantities S, M and R.

Of these two equations, equation (3) is the most important, in the first place, as we shall see later on, because the ear is able to determine the angular frequency b and therefore also the formant frequency F, practically directly and independently from a; in the second place because it is possible to deduce from this equation, that b is determined by the ratio between S and M. This means that the absolute value of these two quantities is not of any importance and that e.g. a large cavity with a wide opening may have the same formant-frequency as a small cavity with a narrow opening.

Now let us first discuss the possibility for the ear to determine b. In order to appreciate this possibility we have only to look at formula (1). We see that $i = 0$, when $\sin b\ t = 0$. It is a matter of simple mathematics to see that the so-called zero-crossings of the damped oscillation indicated at the points 1, 2, 3, 4 etc. in fig. 4 occur when $b.t = n.\pi$ where n is an integer. Consequently the time-spacing of the zero-crossings is equal to

$$\tau_0 = \frac{\pi}{b} = \frac{1}{2F} \qquad (10)$$

This fact is illustrated in fig. 4.

But also the peaks in i appear at intervals of τ_0, independently of the value of the damping constant a. This can be proved as follows. The times at which the peaks, i.e. the maxima, appear in the sound

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[10] Ichiji Tasaki, Nerve impulses in individual auditory nerve fibres of guinea pig, J. Neurophysiol. 17 (1954), 97–122. Ichiji Tasaki and Hallowell Davis, Electric responses of individual nerve elements in cochlear nucleus to sound stimulation (guinea pig), J. Neurophysiol. 18 (1955), 151–158.

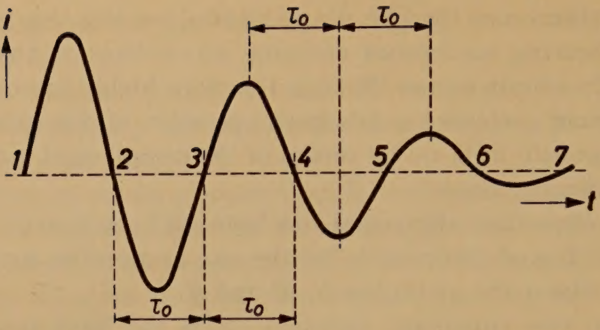

Fig. 4. Zero-crossings and peaks in a damped oscillation.

curve can be found from:

$$\frac{di}{dt} = 0 \tag{11}$$

By applying this formula to (1) we get:

$$\frac{di}{dt} = i_0 \, \varepsilon^{-at} \, (b \cos b\, t - a \sin b\, t) = 0 \tag{12}$$

or:

$$tg\, b\, t = \frac{b}{a} \tag{13}$$

Now it is a well-known property of the tangent of an angle to assume the same value when the angle is changed by the amount π. This means that $b.t$ must change by the amount π, in other words t must change by the amount

$$\frac{\pi}{b} = \tau_0 \tag{14}$$

So the ear can determine b (through τ_0) without concern for the value of a. It can do so either by measuring the time-intervals between the zero-crossings or by measuring those between the peaks. And, what is very important, it can do so without knowing the nature of the resonator.

In order to come to the determination of b the ear only needs to establish certain time-intervals. With regards to these intervals there exist theoretically three possibilities. One might imagine the ear to possess

1. a mechanism enabling it to determine time-intervals between the successive zero-crossings,

or 2. a mechanism enabling it to determine time-intervals between the successive peaks of mixed polarity,

or 3. a mechanism enabling it to determine time-intervals between the successive peaks of the same polarity.

In 1954 we assumed [11]) that the auditory organ determined the time-intervals between the successive peaks of the same polarity (possibility 3).

Now in the same year Tasaki demonstrated [12]) that in the guinea pig the single nerve-elements in the ear respond to unipolar peaks in the excursion (= displacement) of the basilar membrane, which therefore confirms our hypothesis.[13]) He also made it appear plausible that a single nerve-element does not follow all peaks and that its reaction is rather unpredictable. When it does produce a nerve impulse, however, the latter is synchronized with a peak in the excursion of the basilar membrane. What the single fibre cannot achieve, namely to react to all unipolar peaks, a bundle of fibres can achieve. The fibres relieve each other. When one fibre is temporarily inactive, its task is taken over by adjacent fibres.

Although Tasaki's research confirmed the correctness of the choice we had made among the three mechanisms mentioned above, we should like to stress, moreover, that there is no essential difference between these three theoretically possible mechanisms.

If we suppose that the determination of time-intervals between successive peaks of mixed polarity (2) (fig. 6) and between successive peaks of the same polarity (3) (fig. 5) should have to be performed by means of two mechanisms, the difference between these two mechanisms would only be that mechanism (3) would perform what is called half-wave rectifying in electrical engineering, whilst mechanism (2) would undertake full-wave rectifying. By half-wave

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[11]) Lingua IV, 2, p. 175 sqq.

[12]) Tasaki 1954, o.c.

[13]) The anatomy of the cochlea of the guinea pig is known to be similar to that of the human ear.

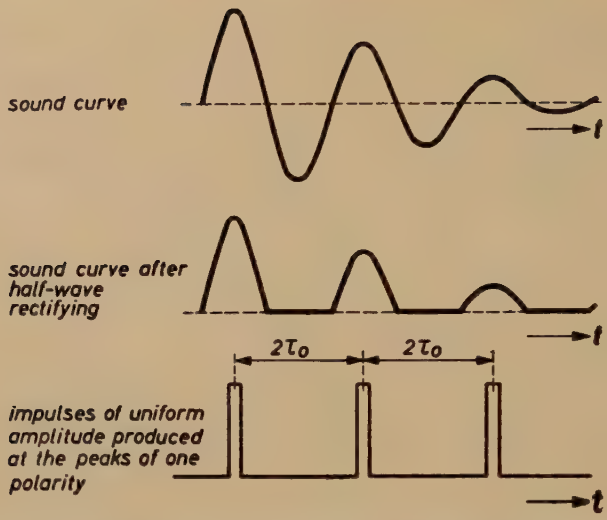

Fig. 5. The production of uniform impulses in the unipolar peaks of a sound curve.

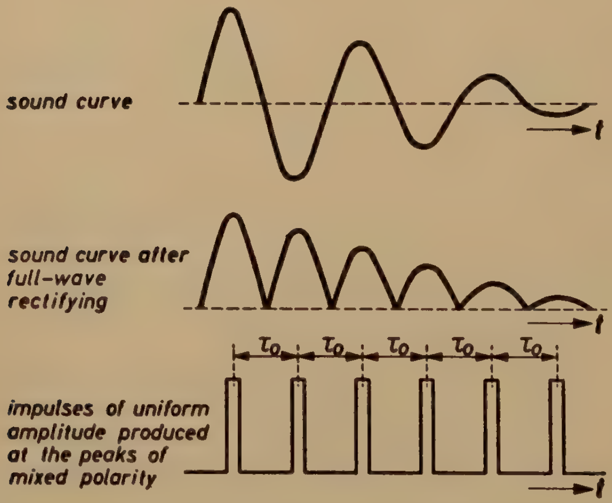

Fig. 6. The production of uniform impulses in the bipolar peaks of a sound curve.

rectifying one understands exclusively measuring the excursions of the same polarity, be it positive or negative, by full-wave rectifying measuring of all excursions irrespective of their being positive or negative. This means that mechanism (3) performs half of the measurements performed by mechanism (2) during the same time.

Now we have to consider the difference between mechanisms (2) and (3) on the one hand and a possible mechanism for measuring the time-intervals between the successive zero-crossings on the other. As already reported in our Lingua-article of 1954, we tried to imitate the action of nerve-elements in the ear by electric models. The action of a haircell was simulated by an electric rectifier consisting of a rectifier cell, a condenser and a resistance.[14] Such an arrangement is characterized by its time-constant which is equal to the product of the capacity C of the condenser and the value R of the resistance. Now, without losing ourselves in technical problems that are rather peripheral to the interests of all but a small minority of the readers of this journal, we may state that a rectifier as needed in such an electric model, can be made to indicate either zero-crossings of peaks simply by varying the time-constant. This allows the conclusion that also the difference between mechanism (1) on the one hand and the other two — viz. (2) and (3) —, is merely formal and not essential.

Now we come to the second important fact that can be learned from equation (3).

In mechanical systems such as we assume the vocal tract to be, the damping is low, so that $\frac{R^2}{4M^2}$ is very small in comparison to $\frac{S}{M}$. For that reason we may simplify (3) to

$$b = \sqrt{\frac{S}{M}} \tag{15}$$

As the relation between F and b is given by $F = \frac{b}{2\pi}$ (10), we get

$$F = \frac{1}{2\pi}\sqrt{\frac{S}{M}} \tag{16}$$

We see from (16) that the formant-frequency is determined by the ratio of S and M. Now the fact already mentioned above, becomes clear: the absolute values of S and M do not matter as long as their

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[14] Lingua IV, 2, l.c.

ratio remains the same, the interesting result of this behaviour being, for instance, that a large cavity with a wide opening may have the *same* formant-frequency as a small cavity with a narrow opening. It is possible to elaborate equation (16) for a cavity with a circular opening [15]:
We then get:

$$F = \frac{c}{8}\sqrt{3\frac{r}{V_0}} \tag{17}$$

where c = 340 m/sec, the velocity (of propagation) of sound, at 20°C and 1 atm.
r = radius of the circular opening
V_0 = volume of the cavity .

It is easy to calculate that a resonator with $r = 0.5$ cm and $V_0 = 4.34$ cm^3, has $F = 2500$ c/s. But a resonator with $r = 1.0$ cm, $V = 8.68$ cm^3, has the same formant!

4. About the importance of equation (2) we shall say only a few words here. From the foregoing it has become clear that the assessment of a requires complicated calculations. Is there any possibility for the ear of shunting the calculations for which it seems not to have the necessary mechanisms? As we already pointed out in 1954, there is a slight possibility that the ear contains the makings of a so-called analogue computer. By this expression is meant, that in this case the ear is able to perform measurements of a logarithmic nature, because it possesses elements that behave logarithmically themselves, viz. the haircells with their time-constants.[16]

At the moment it is not yet known definitely, whether the determination of the damping constant is of any importance for the recognition of speech sounds. The experiments of one of us (Mol) indicate that it is not.[17] Even in the traditional Fourier-formant description of vowels only the frequency position of the formants is indicated or measured, whereas the damping of the resonator is hardly mentioned.

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[15] E. Skudrzyk, Die Grundlagen der Akustik, Vienna 1954, p. 350.

[16] Lingua IV, 2, l.c.

[17] The same is asserted by E. E. David Jr, Signal theory in speech transmission, IRE Transactions on circuit theory. Vol. CT–3, no. 4 (1956) p. 239.

4. SOME CONCLUSIONS

1. The ear can at best measure some relations between the acoustic parameters of the vocal tract, but not their absolute values, because it is not able to ascertain the physical properties of the air-puffs produced by the vocal cords.

2. The natural frequency (formant) or its reciprocal, the natural period of a simple cavity, is one of these relations. It can be determined by peak-indicating mechanisms without having to assume that the ear performs a Fourier analysis. Of these mechanisms, the one we postulated in 1954 is the most likely, as can also be seen from the measurements by Tasaki.

3. The diversity of the sound producing organs does not affect perception as long as a certain relation between the quantities which determine the resonator system of the vocal tract remains the same, in other words as long as the formant remains the same. For it has been shown, that shape, volume and opening of the cavities may differ without the formant being changed.

4. The way in which the production of speech sounds is attuned to their interpretation by the auditory organ is in complete agreement with the manner in which the growing child gradually learns from his surroundings to control the production of the relevant speech sounds. By listening to the speech sounds it produces and to those produced by others it adjusts its articulators until the acoustic result is found acceptable by the language community. It does not learn to put its articulators into fixed, prescribed positions. It can choose from among a multitude of possibilities which all produce the desired acoustic result. It gradually makes a selection from random movements of the articulators. The position of the articulators is not planned; once a "correct" position has been found by chance, it is maintained as soon as the resulting sounds are acceptable for the speech community in which the child lives.18)

5. The fact that the measurement of i_0 would be of no use to the ear, in other words that the "overall" amplitude of the sound curve is "floating", has another interesting and important consequence. The absolute value of i_0, which is proportional to J_0, cannot only

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18) We hope to discuss this problem in greater detail in a later paper.

be changed by altering J_0, but it can also be modified in the following way. The quantity we have called $\dot{i}$ (equation (1)) was defined as the velocity of the piston in the neck of the bottle (= at the lips). Now, when we measure this velocity at some distance from the mouth, it will be smaller than $\dot{i}$. The formula for this velocity is, however, quite similar to equation (1), for it contains the *same frequency b* and the *same quantity a*, but its $\dot{i}_0$ is smaller than that of the velocity measured directly at the lips of the speaker. This means that in speech-communication the distance between the speaker and the listener has, within wide limits, no influence on intelligibility. Language is a distortion-resistant system. This is another argument against introducing intensity of sound as a relevant factor in language.19)

APPENDIX

1. *The quantities S, M and R*

Though the wave-equation underlying the acoustic vibrations in free air looks extremely simple 20) its application to randomly shaped cavities is an enterprise that meets with numerous mathematical difficulties. What is called an acoustic resonator consists in its most elementary form of a hard-walled cavity with an opening.

The elementary theory of resonators simply assumes a constant velocity of the air particles in the opening as if a piston were present.21) In other words, the air in the neck of the resonator is considered as a lumped mass M that moves up and down with the velocity $\dot{i}$. This velocity is given by the following expression:

$$\dot{i} = \frac{dx}{dt} \tag{18}$$

---

19) H. Mol and E. M. Uhlenbeck, The linguistic relevance of intensity in stress, Lingua V, 2 (1956), p. 205–213.

20) Bernhard Riemann, Partielle Differentialgleichungen, Braunschweig, 1938, p. 271 sq. E. Skudrzyk, o.c. p. 102 sq. Reference data for Radio Engineers, published by Federal Telephone and Radio Corporation, 1950, p. 510–519.

21) Asger Kjerbye Nielsen, Acoustic resonators of circular cross-section and with axial symmetry, Transactions of the Danish Academy of Technical Science 10 (1949). Reference data for Radio Engineers, l.c.

where x is the displacement of the piston (see fig. 7), called positive here in the direction of the cavity. Being a moving mass, the piston is the seat of kinetic energy. Now the trained acoustician knows these assumptions to be rather crude, but their pertinence lies in the fact that *sound measurements show that it is allowed to consider the air in the neck as a piston, even if it is not possible to calculate the value of its mass M with a high degree of accuracy.*

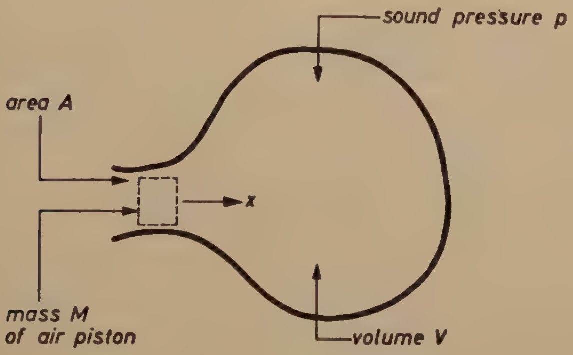

Fig. 7. Simple resonator.

For describing the behaviour of the volume of air (V) enclosed in the hard-walled cavity the following crude approximation is in general use. For not too high frequencies the air pressure P is considered to be the same at every point of the cavity. Furthermore it is supposed that the sound vibrations obey the laws of adiabatic processes, i.e. processes in which there is no opportunity of exchanging heat with the environment.

Under the above-mentioned assumptions we have:

$$P.V^k = \text{constant} \tag{19}$$

where k = ratio of the specific heat of air at constant pressure to that at constant volume.

As equation (19) is constant, we know that when P and V show small variations ΔP and ΔV resp., the following expression holds good:

$$\Delta P.V^k + P.k.V^{k-1}.\Delta V = 0 \tag{20}$$

or

$$\Delta P = -\frac{k\,\Delta V}{V}\,P \tag{21}$$

Now in acoustics there are practically always small variations around high values of equilibrium. It is still exact to write

$$P = P_0 + \Delta P \tag{22}$$

where
P = total pressure of the air
P_0 = steady barometric pressure
ΔP = excess pressure, mostly called sound pressure.

Even in loud speech P_0 is about 1 000 000 times as big as ΔP, so that calling ΔP small in comparison with P_0 is not too crude an approximation. For that reason it is allowed to replace P by P_0 in the right hand member of expression (21).

It is customary to use the following notation for the excess pressure:

$$p = \Delta P \tag{23}$$

When the piston moves inwards the volume V of the air in the cavity is changed by the amount

$$\Delta V = -A \,.\, x \tag{24}$$

where A = the area of the piston, x = the displacement of the piston (see equation (18)). The minus sign is used here because as we called x positive in the direction of the cavity, the volume diminishes, in other words there is a negative change.

We may write:

$$V = V_0 + \Delta V \tag{25}$$

where V_0 is the volume of the air in the cavity when the piston is in its position of equilibrium. For the same reason as stated above in our discussion of P and P_0, we replace V by V_0 in the denominator of the right hand member of equation (21).

After applying the above-mentioned formulae and approximations to equation (21) we finally get:

$$p\,A = \frac{k\,P_0\,A^2}{V_0}\,x \tag{26}$$

The factor

$$S = \frac{k P_0 A^2}{V_0} \tag{27}$$

is called the stiffness of the air-cushion in the cavity. Sometimes it is more convenient to use the reciprocal

$$C = \frac{V_0}{k P_0 A^2} \tag{28}$$

which is called the *compliance* of the air cushion in the cavity.[22])

Formula (26) shows that the excess pressure in the cavity is proportional to the volume-displacement of the piston in the neck of the resonator.

Combination of equations (26), (27) and (28) leads to:

$$p.A = S.x = \frac{x}{C} \tag{29}$$

When there is excess pressure in the cavity, be it positive or negative, the cavity contains potential energy which enables it to react on the piston. Whenever the air cushion in the cavity is compressed or rarefied it exerts an elastic force on the piston given by:

$$p.A \tag{30}$$

When p is positive (compression) the cavity tries to drive out the piston. When, on the other hand, p is negative (rarefaction) the cavity tries to suck in the piston.

Still other forces act on the piston.

When we try to accelerate the mass M of the piston we must overcome the well-known force of inertia, according to the laws of classical mechanics given by:

$$M \frac{d^2x}{dt^2} \tag{31}$$

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[22]) It is possible to define the stiffness and the compliance of a cavity in another way, namely by eliminating the factor A^2 in (26) and (27). This can be done by working with the so-called volume displacement $X = x.A$ instead of merely with x. This method becomes valuable when vocal tracts consisting of more than one cavity have to be calculated. For our simple resonator we need not complicate matters.

In general the piston is also subject to friction. In other words, the motion of the piston is impeded by another force, namely the force of friction. It is common practice to assume that the force of friction is given by:

$$R\frac{dx}{dt} \tag{32}$$

This formula (32) implies that the force of friction is proportional to the velocity of the piston, which is only true for low velocities. A second difficulty lies in the fact that it is impossible to calculate R with a high degree of accuracy. This, however, need not trouble us here as the knowledge of the exact value of R is unimportant for the problem of the recognition of speech sounds. Moreover, R is always very small in mechanical systems so that the force of friction can mostly be neglected in comparison with other forces.

Via the force of friction the piston loses kinetic energy which is transformed into heat.

The piston also loses energy by radiation into space. It is in contact with the surrounding air on which it exerts a force. (We can also say that the surrounding air exerts a force on the piston, but after all that is a question of action and re-action!). Via the force which couples the piston to the air interchange of energy can take place. The net result, however, is that the piston presents a certain amount of energy to the surrounding air which it never receives back. For that reason this amount of energy might as well have been transformed into heat. Therefore we take the freedom of incorporating the radiation-loss into R, the coefficient of friction. We call R the *combined coefficient of friction and radiation.*

2. *The formula for the velocity i*

For the motion of the piston we have the following so-called dynamic equation:

$$M\frac{d^2x}{dt^2} + R\frac{dx}{dt} + p.A = 0 \tag{33}$$

In this equation we recognize the force of inertia (31), the force of friction and radiation (32) and the elastic force (30). According to the laws of classical mechanics the sum of these forces equals zero.

Now the pressure p in the cavity (see fig. 8) is the total result of the displacement x of the piston M and the displacement x_0 of the air-puff at T. These displacements together cause the following change of volume:

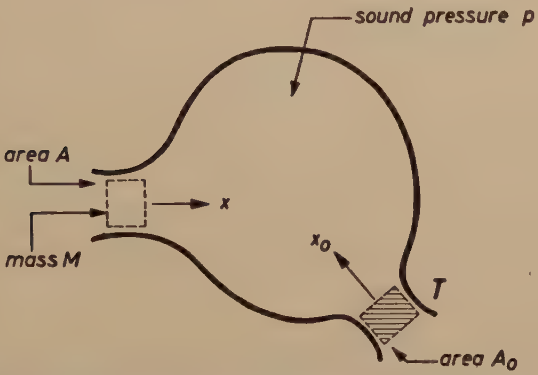

Fig. 8. Simple resonator with throat-like inlet of air puffs.

$$\Delta V = -\,(x.A + x_0.A_0) \tag{34}$$

By combining (21), (22), (23), (25) and (34) we get:

$$p = \frac{kP_0}{V_0}\,(x.A + x_0.A_0) \tag{35}$$

After making use of (27) and after some elaboration we finally obtain:

$$p.A = S.x + S.x_0.\,\frac{A_0}{A} \tag{36}$$

By substituting (36) in (33) we get:

$$M\frac{d^2x}{dt^2} + R\frac{dx}{dt} + S.x = -\,S.x_0.\,\frac{A_0}{A} \tag{37}$$

After differentiating both members:

$$M\frac{d^3x}{dt^3} + R\frac{d^2x}{dt^2} + S\frac{dx}{dt} = -\,\mathrm{S}.\,\frac{A_0}{A}\,.\,\frac{dx_0}{dt} \tag{38}$$

Some years ago one of us (Mol) investigated the nature of the air-puffs in the human throat by introducing a small microphone into the pharynx and bringing it as close to the vocal cords as possible.[23] It appeared that the velocity of an air-puff was constant. For that reason in formula (38) $\frac{dx_0}{dt}$ must be regarded as a constant. For simplicity's sake we choose the following notation:

$$J_0 = -\frac{A_0}{A} \cdot \frac{dx_0}{dt} \tag{39}$$

where, as already said, J_0 is a constant.
Also for simplicity's sake we recall formula (18):

$$i = \frac{dx}{dt} \tag{18}$$

Combination of (38), (39) and (18) yields the following result:

$$M\frac{d^2i}{dt^2} + R\frac{di}{dt} + S\,i = S\,J_0 \tag{40}$$

Equation (40) determines the velocity i of the piston *during the short time-interval Δt that an air-puff with the velocity J_0 is admitted through the throat.*[24] When the vocal cords close again (i.e. when the opening at T is closed again), the following formula holds:

$$M\frac{d^2i}{dt^2} + R\frac{di}{dt} + S\,i = 0 \tag{41}$$

Summarizing:
during the air-puff i is determined by (40)
after the air-puff i is determined by (41).

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[23] These experiments were carried out in cooperation with D. Walch, then of the Throat, Nose and Ear Clinic of Leiden University, Director prof. dr H. A. E. van Dishoeck.

[24] Strictly speaking J_0 is not the velocity $\frac{dx_0}{dt}$ of the air-puff itself. According to (39) it is proportional to it, but differs from it by a factor $\frac{A_0}{A}$ which represents the ratio between the areas of the throat and the lip opening. There is no objection, however, against loosely labeling J_0 as the velocity of the air-puff. When calculating more complex acoustic systems we have to introduce the volume displacement and the volume velocity, cf note 22).

Because Δt is so short, in phonetics we are only interested in what happens after the air-puff.

We shall not burden the reader with the complete mathematics of the solution of equations (40) and (41). We only state here that it leads to the expression:

$$i = i_0\, \varepsilon^{-at} \sin b\, t \tag{1}$$

where:

$$a = \frac{R}{2M}, \text{ the damping constant} \tag{2}$$

$$b = \sqrt{\frac{S}{M} - \frac{R^2}{4M^2}} \text{ the natural frequency,} \tag{3}$$

$$i_0 = \frac{J_0\, \Delta t\, S}{b\, M}, \text{ the amplitude} \tag{4}$$

Expression (1) gives the velocity i of the piston in the neck of the resonator *after* an air-puff (velocity J_0) has been injected during a short time Δt.

Leiden H. MOL and E. M. UHLENBECK

LARYNGALREFLEXE UND DAS INDOGERMANISCHE „SCHWACHE" PERFEKTUM

Zusammenfassung

Verschiedene Laute der idg. Sprachen, wie *-k-*, *-w-*, *-d-* waren als durch das Auftreten von Laryngalen bedingt erkannt worden (Sturtevant, Martinet u.a.). Diese Laute sind morphologisch als scheinbare Suffixe der denominativen Perfekta charakteristisch, wie schon von Sturtevant für das griech. -κ- Perfektum gezeigt wurde. Die vorliegende Untersuchung zeigt, dass die „Suffixe" der Perfekta von nichtradikalen Verben („schwache" Perfekta) auch bei Verben mit laryngalem Basisauslaut auftreten, und zwar sind in der Regel die Basisauslaute des Perfektums dieser radikalen Verba in jeder Sprache dieselben wie die der denominativen Perfektstämme. Es stellt sich also heraus, dass der laryngale Charakter des idg. Denominativsuffixes diese Aehnlichkeit hervorruft, und Erklärung auf Grund einer innersprachlichen Analogie wird abgelehnt. Es gibt daher keine suffigierten neben ablautenden Perfektbildungen im ursprünglichen Zustand der idg. Sprachen, und eine Theorie von Agglutination wird dadurch hinfällig. Die Einzeluntersuchung erstreckt sich auf das Lateinische, das Griechische, das Gotische und das Umbrische. Als Nebenresultate gelangt man zu Erklärungen der griech. Bildungstypen auf -εύ-ς, -ίς (-ίδ-ος) als laryngalauslautend, ebenso des Verbalstammes der Präsenstypen auf -ίζω, -άζω.

In den letzten Jahren wurde beträchtlicher Fortschritt in der Feststellung der lautlichen Gestalten erzielt, die die „Reflexe" der idg. Laryngale in den historischen Einzelsprachen anzunehmen imstande sind. So konnte die Verschiedenheit und Mannigfaltigkeit der hauptsächlich unsilbischen (konsonantischen) Lauteigenschaften, die sich unter veränderlichen Bedingungen zeigen können, ins rechte Licht gerückt werden. Von verschiedener Seite wurde auf *-k-* [1]), auf damit im Wechsel stehendes *-w-* [2]) und auf *-d-* (oder *-ddj-* in augenscheinlichen Palatalisierungsstellungen) verwiesen, sowie auch auf *-g-* (*-ggw-*), welches im Zusammenhang mit dem letztgenannten die sogenannte germanische „Verschärfung" darstellt [3]); hiermit haben wir nur die „überraschenderen" Feststellungen zusammengefasst – überraschend, als sie den der Laryngaltheorie noch immer ablehnend gegenüberstehenden Gelehrten einen weiteren Grund darboten, sich von der scheinbaren ,,Regellosigkeit'' solcher Lautvertretungen von der Akzeptierung neuerer idg. vergleichender Phonologie überhaupt abschrecken zu lassen.

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[1]) Sturtevant, Language 16, pp. 273–284; Martinet, BSL 51, pp. 42–56.

[2]) Hamp, Word 11, pp. 399–403; Martinet, Word 12, pp. 1–6.

[3]) Lehmann, Proto-Indo-European Phonology, pp. 47 ss., cf. Martinet, BSL 51, p. 55.

Andererseits führte die Verschiedenheit der genannten ,,Reflexe'' oder Realisierungen [4]) zu einer analogen Bemühung, aus ihr eine entsprechend grosse Anzahl (ur- oder vor-) indogermanischer Laryngalphoneme abzuleiten, um den mannigfaltig belegten historischen Lautgestalten gerecht zu werden. Es ist hier nicht beabsichtigt, die Frage nach der genauen Anzahl solcher Laryngale irgendwie zu präjudizieren; es scheint mir daher angebracht, auf ein etwas aus der Mode gekommenes Zeichen zurückzugreifen, nämlich auf das vage *X* [4a]); dieses Symbol kann gerade wegen seines Mangels an Eindeutigkeit entweder für den oder für irgendeinen Laryngal gelten und gestattet uns daher, die Geschichte der Laryngalrealisierungen von einer allgemeineren Warte aus zu betrachten und auf Erscheinungen hinzuweisen, die für jegliche oder alle idg. Laryngale charakteristisch sind. Und trotzdem sei es hervorgeheben, dass nach der hier zum

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[4]) Der Ausdruck ,,Realisierungen'' im Zusammenhang mit laryngalen Phonemen mag unpassend erscheinen, wenn man im Auge hat, dass die Laryngale ,,ur-'' oder gar ,,vorindogermanisch'' sind und in der phonemischen Struktur der Einzelsprachen keine Rolle spielen. Es mag jedoch eine gewisse, heute unpopuläre, Phonemauffassung geben, auf Grund derer Phoneme so abstrakt und mit Zuhilfenahme morphologischer Gesichtspunkte definiert werden können, dass der Ausdruck ,,Realisierung'' angebracht erscheint. Hierher gehört auch meine Vorliebe für das Setzen des Schrägstrichsymbols, und eine gewisse Abneigung gegen Asteriske, wo sie nicht unumgänglich nötig sind; ich möchte auf jeden Fall auf meine diesbezüglichen prinzipiellen Bemerkungen in Revue Biblique, 60, pp. 30 ss., besonders pp. 35–36, verweisen. Eine Nichtannahme einer solchen Auffassung tut jedoch dem Gedankengang der vorliegenden Untersuchung in keiner Weise Abbruch, denn bevor die Verhältnisse zwischen den verschiedenen Laryngalreflexen phonologisiert wurden, waren diese Reflexe (in irgendeiner vorhistorischen Periode) Allophone eines oder mehrerer Phoneme. Wenn man auch dieser Ueberlegung nicht zustimmt, so mag man alle dargestellten Lautverhältnisse diachron oder vergleichend auffassen und ohne Einbusse der Klarheit statt ,,Realisierung'' – ,,Entwicklung'' oder ,,Lautvertretung'' lesen. – Hammerich, Laryngeal before Sonant, p. 3, spricht von den historischen ,,materializations'' des ,,IE. laryngeal phoneme''.

[4a]) "I shall use the non-committal symbol *H*" (Hammerich, o.c., p. 3).

Ausdruck gebrachten Auffassung die Anzahl der angesetzten idg. Laryngale eher vermindert als vermehrt zu werden hat.

Es war im Verlauf der Behandlung der erwähnten Probleme mehrmals gelungen „d'éliminer le recours à un élargissement" [5] oder ein „set of tricks" zu konstruieren „for disposing of a host of uncomfortable suffixal (phonemes)" [6] vielerlei Art. Trotzdem will es scheinen – so überraschend dies auch sein mag –, dass man den phonologischen oder besser morphophonologischen Status der verglichenen „Reflexe" innerhalb der synchronen Systeme der Einzelsprachen, in denen sie in Erscheinung treten, aus dem Auge liess; eine Reihe von Ergebnissen, die sonst mit nicht allzu grosser Schwierigkeit hätten zu Tage gefördert werden können, blieben daher unerreicht.

Eine der Fragen, die in den betreffenden Untersuchungen kaum je gestellt wurden, ist die nach dem phonologischen Inhalt (der Summe der phonemischen Relevanzeigenschaften) der „Reflexe" innerhalb der Sprachsysteme, in denen sie zur Realisierung gelangen; ebenso wurde nicht die Frage nach den Erscheinungsbedingungen dieser Reflexe in gerade denjenigen Sprachen gestellt, wo sie in Erscheinung treten. Es ist ja beinahe banal, darauf hinzuweisen, dass der genannte Phoneminhalt festgestellt werden muss, bevor wir an eine sprachvergleichende Untersuchung der betreffenden Realisierungen schreiten können. Es ist ebenso trivial, zu betonen, dass die nichtrelevanten Lauteigentümlichkeiten der „Reflexe" hierbei aus dem Spiel gelassen werden müssen; hierbei aber zeigt es sich (wie wir unten darzulegen versuchen), dass die betreffenden Laute um ein Beträchtliches ärmer an relevanten Eigenschaften sind (immer im Rahmen des synchronen morphophonologischen Systems gesehen), als auf den ersten Blick erscheinen möge. So weit sich auf dieser Stufe feststellen lässt, ist es gerade die Lokalisierungseigenschaft (– sie ist es, die den Eindruck der Mannigfaltigkeit der „labialen", „velaren" etc. Reflexe hervorruft! –), die sich angesichts des Fehlen eines ceteris paribus anders lokalisierten Oppositionsgliedes als phonologisch irrelevant herausstellt. Als Vergleichsobjekt für die idg. Beziehungen stellt sich also viel weniger dar als ein velarer Verschlusslaut *-k-* oder ein dentaler Verschlusslaut *-d-* (vom „Stimm-" oder Intensitätscharakter ganz abgesehen); vielleicht haben wir solche idg. Phoneme anzusetzen, deren Vertretungen in den Einzelsprachen phonologische Einheiten von bloss zwei Eigenschaften (im phonologischen Sinne) sind, der des Verschlusses und allfällig der des „Stimm"- oder „Intensitätscharakters". Eine derartige Lautvergleichung hätte es also mit Objekten von viel grösserer Aehnlichkeit zu tun; ausserdem ist es für Sonanten ja angemessen, sich nicht in die traditionelle Dreiheit „labial-dental-velar" einzuordnen.

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[5] Martinet, BSL 51, p. 45.

[6] Id., Word 12, p. 2.

Was wir vor uns haben, ist eine Reihe von Lauten in Talstellung (oder zumindest nicht in Gipfelstellung) des Silbenverlaufs, seien diese Laute nun Reflexe der Laryngalphoneme selbst oder eher Gleitlaute zwischen einem nichtsilbischen Laryngal und seinem Nachbarlaut; doch auch im letzteren Falle können sie zumindest als ein Teil der Realisierung des Laryngalphonems betrachtet werden können, oder als ein Teil der Realisierung desjenigen Phonems, das historisch an Stelle des Laryngals getreten ist (siehe Fussnote 4).

Auf Grund der hier vorgeführten Reflexe war es nun einer Reihe von Linguisten möglich geworden, bisher als unvergleichbar betrachtete idg. Morpheme oder Formen auf eine Vergleichsbasis zu stellen; wir wollen versuchen, dasselbe hier für das idg. Perfektum (oder im Hinblick auf einige Sprachen: „Präteritum") zu erreichen, wo immer dasselbe als „suffigiert" oder „erweitert" erscheinen mag.

Von mancher Seite war durch geschickte Manipulation versucht worden, das Pseudosuffix mehrerer idg. Perfektbildungen auf Grund von Laryngalen aus dem Wege zu räumen. So wurde das lat. *-u-*perfektum behandelt 7), das griechische Perfektum auf -κ- 8); nichtsdestoweniger finden wir nirgends – soweit ich nichts übersehen habe – den Versuch beide auf eine Linie zu stellen, obwohl eine Behandlung einer Alternation *k/w* (z.B. κόραξ/*coruus*) im oben zitierten Aufsatz Martinets vorliegt. Zuoft wurde die Analogie herangezogen: Hamp, l.c., nimmt einen laryngalen Ursprung für das *-u-* in *flaui* an, aber schiebt das von *laudaui* zu leicht als Analogie ab, indem er im letzten Satze seiner Untersuchung kurz sagt: „Once having arisen as a distinctive formative element on apparent ‚vowel' stems, the element */*-w-*/ could then have become a productive suffix for the then vocalic stems".

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7) Hamp, l.c.

8) Sturtevant, l.c.

Wenn wir aufs Griechische zurückkommen, so ist das Auftreten des -κ- nicht nur im Perfektum, sondern auch in ἔθηκα, ἧκα, ἔδωκα von nicht geringer Bedeutung. Dieselben Wurzeln haben -κ- im Perf. wie im Aor. und sie sind die klassischen Musterworte für die Lehre von den drei Laryngalen. Diese Umstände scheinen mir darauf hinzudeuten, dass die Kraft der analogischen Ausbreitung nicht überschätzt werden darf. Die -κ-Aoriste waren und blieben im Rahmen des griechischen Aoristsystems vollkommen isoliert und ihr Bildungstypus zeigte gar keine Lebendigkeit – sie wirkten nicht einmal auf ἔβην, ἔγνων u. ähnl. ein. Anderseits zeigt die gleichmässige Behandlung dieser drei Verbalwurzeln im Aorist, dass das Auftreten des -κ- nichts mit irgendeinem bestimmten der drei (oder vier) Laryngale zu tun haben kann [9]).

Jedoch der augenfällige Parallelismus zwischen τέθηκα, εἷκα (oder ἔθηκα, ἧκα) und *feci*, *ieci* [10]) stellt uns deutlich vor Augen, dass eine einfache Formel „gr. -κ- – lat. -*u*-" den Tatsachen nicht Rechnung tragen würde [11]).

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[9]) Sturtevants Ueberlegungen führen nicht zwangsläufig zur Annahme eines bestimmten Laryngals, der im griech. -κ- „reflektiert" wäre; die Rückschlüsse Martinets zwingen jedoch zum Ansatz eines solchen.

[10]) Sturtevant, l.c.. Die Präsensstämme *iacĭ-*, *facĭ-* erweisen, dass die Wurzelstruktur und nicht die Charakteristik des Perfektstammes das Auftreten des -*c*- bedingt.

[11]) Eben der erwähnten Entsprechung von lat. -*c*- mit griech. -κ- wegen. – Angesichts des oben über die beträchtliche Mannigfaltigkeit der Lautgestalten, die ein Laryngal annehmen kann, Gesagten, stünde zu erwarten, dass auch irgendwo lat. -*c*- griech. -υ- entspricht, sowie auch lat. -*u*- griech. -υ-. Diese Fälle scheinen auch tatsächlich vorzukommen. Nach Martinet, o.c., p. 45, entsprechen *senex*, *loquax* und ihresgleichen dem idg. Typus auf -*/-*eX*-*s*/ = *-*ā*-*s*. Wo hat sich nun dieser Typus im klassischen Griechisch erhalten? Die gewohntermassen beigebrachten Beispiele νέαξ, λίθαξ sind viel zu weit hergeholt, als dass sie als legitime Vertreter eines so weitverbreiteten und regulären Bildungstyps dienen könnten. Es ist schon festgestellt worden (vgl. z.B. Schwyzer, Griech. Gramm. I., p. 476), dass die in mehreren Gesichtspunkten dem idg. -*ā*-typus am nächsten stehende griechische Bildung die auf Nom. -εύς ist; diese Bildungsgruppe ermangelt ihrerseits scheinbar in solchem Masse Beziehungen zum aussergriechischen Indogermanischen, dass die mysteriösesten vorgriechischen Dialekte und ausgefallensten Lehnwörter herangezogen wurden, um ihrem Suffix eine historische Erklärung zu liefern. Die erwähnten Stämme werden gewöhnlich als auf *-*ēw*- ausgehend angesehen, wobei der durch den Ausfall des intervokalischen -*w*- entstandene Hiatus zur Kürzung des -*ē*- Anlass gegeben haben soll. Der Gen. Sg. wäre hiernach eine Entwicklung von *-ῆϜ-ος > -ῆος > -έως oder

Zum Schlusse dieser Überlegungen haben wir die Mannigfaltigkeit der „Reflexe” auch innerhalb der Perfektbildung ins Auge zu fassen, die bei ein und derselben Wurzel in verschiedenen Sprachen und bei verschiedenen Wurzeln in ein und derselben Sprache auffällt: gegenüber gr. ἔγνω-κ-α finden wir lat. *no-u-i*; got. *wilda*, *iddja* (s. unten) gegenüber den gleichbedeutenden Perfekten lat. *i*(*u*)*i*, *uolui*, und der Wechsel von -κ- und -δ- in gr. κέχυκε, κεχύδατο scheinen alle deutlich darauf hinzuweisen, dass die Verschiedenheit der Perfekt„suffixe” oder ”-erweiterungen” nicht durch eine Verschiedenheit des basisschliessenden Laryngals bedingt ist. Dahere glaube ich, dass ein eingehenderes Studium der Behandlung verschiedener Verbalwurzeln innerhalb der morphologischen Systeme der Einzelsprachen mehr Licht auf die Sachlage werfen kann.

* * *

-έος. Die letzte Stufe der Entwicklung, die Kürzung oder Metathese, soll in einigen Dialekten stattgefunden haben, während andere nicht an ihr Teil hatten. Es ist jedoch diesbezüglich wichtig festzustellen, dass gerade das Flexionsparadigma auf -εύς, *-ῆϝος dasjenige ist, für welches sich in keinem Dialekt tatsächliche Belege auffinden lassen (vgl. Bosshardt, Die Nomina auf -εύς, Diss. Zürich 1942, pp. 157–161). Belegt sind:

		vor -s		vor Vokalen	
Paradigmentypus	I	-ευ-	*-ew-*	-εϝ-	*- e w -*
	II	-ευ-	*-ew-*	-ε-	*- e ∅ -*
	III	-ευ-	*-ew-*	-η-	*- e : -*
	IV	-ευ-	*-ew-*	-α-	*- a (:) -,*
auf Grund derer wir zur folgenden Struktur gelangen:			*-ew-*		*- e X -,*
denn wir finden nicht:			*-ew-*		*- e : w -.*

In anderen Worten, *-w-* erscheint hier unter denselben Bedingungen wie *-c-* in *senex* laut Martinet. ʽΙππεύς ist daher als mit */*-eX-s*/ suffigiert anzusehen und ist daher innerhalb des Idg. nicht mehr beziehungslos. Vgl. auch die Akk. Sg. auf -ην, sowie den doppelten Nominativ ῎Αρης — ῎Αρευς (Bosshardt, l.c.). Wenn die Basiselemente von ῎Αρης — *X-r-X* sind kann man skr. *ari-s* (mit „seṭ-*i*”) vergleichen.

Ähnliche Überlegungen lassen sich für das verwandte Paradigma von ναῦς anstellen, aber in diesem Falle kehrt das *-w-* in einer Reihe von idg. Sprachen wieder, insbesonders im Lateinischen, dessen mit *nauis* offensichtlich sinnverwandtes *nare* uns über die wahre Natur des *-u-* von *nauis* belehrt; vgl. nunmehr hierzu gr. νέω. Dies ist also der Fall, in dem sowohl das Griechische, wie auch das Lateinische *-w-* haben, jedoch unter verschiedenen Bedingungen (das lat. *-u-* steht nicht im Kontakt mit *-s*). Vgl. Fussnote 23*a*.

Unter idg. ,,schwachen" Perfektum verstehen wir, gemäss dem gewöhnlichen Sinne des Ausdrucks in der germanischen Morphologie, ein Perfektum (Präteritum) ohne Vokalwechsel, eine Bildung, die bekanntlich fast ausschliesslich bei denjenigen Verben gebraucht wird, die eine Vokalabstufung nicht zulassen: – den abgeleiteten. Das schwache Perfektum ist im Grunde genommen reduplikationslos, von sekundären griech. Perfektstammbildungen vom Typus πεποίηκε abgesehen, die bekanntlich erst im nachhomerischen Griechisch allmählich in den Gebrauch kommen. Am schwachen Perfektstamm tritt in den historischen Einzelsprachen ein ,,Suffix" in Erscheinung, das aus einem gewöhnlich unsilbischen Phonem besteht: lat. *-u-* (meist konsonantisch); gr. -κ-, aber, wie wir weiter unten feststellen werden, nicht nur -κ-; umbr. *-f-*, osk. *-tt-*, germanisch *-d-*. In all den genannten Sprachen jedoch ist das Auftreten dieses sog. Tempusstammsuffixes keineswegs auf die Perfekta der abgeleiteten Verba beschränkt, sondern, wie wir schon oben mit Hinblick auf *flaui* angedeutet haben, dasselbe ,,Suffix" tritt auch bei einer bestimmten Gruppe von anderen, radikalen, Verben auf.

Diese Tempusstammcharakteristik tritt nun regelmässig an solche Verbalbasen [12]) an – oder besser: tritt im Auslaut solcher Verbalbasen auf –, bei denen im allgemeinen an ein laryngales letztes Basenelement zu denken ist. Angesichts der Tatsache, dass das gewöhnliche Ableitungssuffix der denominativen Verbalstämme ein idg. Laryngal ist oder in einen solchen ausgeht, ist dieser Parallelismus zwischen den Perfektstämmen der Denominativa und denjenigen der laryngal auslautenden Basen nicht weiter verwunderlich; die Aehnlichkeit von *flaui* und *laudaui* muss daher nicht unbedingt sekundärer (analogischer) Natur sein, sie geht vielmehr Hand in Hand mit der Ähnlichkeit des Auslauts der Verbalstämme *lauda-*, *fla-* selbst.

,,Basen, bei denen an ein laryngales letztes Element zu denken ist", sind solche, die nur éin konsonantisches Element besitzen; hierbei verstehen wir unter konsonantischem Element auch eine morphologisch untrennbare Konsonantengruppe, z.B. *st-* von *stare*, ἵστημι etc., nicht jedoch die trennbare Gruppe von βλη- (vgl. βαλ-εῖν), schliessen aber natürlich die traditionellen Sonanten, auch wenn sie unsilbisch sind, von der Definition der Wurzelkonsonanten aus 13). Die meisten hier zu besprechenden Wurzeln sind schon lange auf Grund idg. Vergleichung als laryngalauslautend angesehen worden. Setzen wir das Zeichen *I* (=Initial) für den Basisanlaut (Konsonant, untrennbare Konsonantengruppe oder ∅, d.h. Laryngal), *S* für Sonant, *C* für Konsonant (ausser wenn *I*), so ist *I-S-C* eine Normalbasis, *I-S* wird als *I-S-X* betrachtet, *I-S-C-X* jedoch nur dann angesetzt, wenn zwingende morphologische oder sprachvergleichende Überlegungen dazu führen.

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[12]) Um verfrühte Diskussionen über Wurzel- und ,,thème"-Struktur zu vermeiden, gebrauche ich hier gelegentlich den Ausdruck ,,Basis" für das verbale oder denominative Morphem, welches dem Modusmorphem unmittelbar voraufgeht, also z.B. für *flā-* in *flāre*, oder für *-ā-* in *laudāre*. Siehe jedoch die gleich folgenden Erörterungen.

Ausserdem werden wir in der Lage sein, festzustellen, dass die genannten Pseudosuffixe nicht nur im Perfektstamm auftreten, sondern auch sonst mit Null alternieren können. Diese Alternation wird unter denjenigen morphologischen Bedingungen offenbar, die wir gewöhnlich als geeignet betrachten, einen Wechsel zwischen schweren und leichten Basen hervor zurufen. Die idg. Abstufung einer schweren Verbalbasis im Singular zu einer leichten im Plural drückt sich im Wechsel zwischen ἔδωκα, ἔθηκα (Sg.) und ἔδομεν, ἔθεμεν (Pl.) aus, vgl. ἔβην : ἔβασαν, ἔφθη : φθάμενος. Ebenso entspricht das Fehlen des -ϰ- im medialen Perfektum des Griechischen der Schwachstufe z.B. des skr. medialen Perfektums gegenüber der Vollstufe des Aktivums. Was das Auftreten einer leichten Basisstufe auch im Plural des idg. (skt., german.) aktiven Perfektums betrifft, so wird sich zeigen, dass gerade in den ältesten Stadien der griechischen Sprache diese Abstufung sich in der Begrenzung des -ϰ-Elements auf den Singular abzeichnete. Wir können infolgedessen zum Schlusse gelangen, dass das Auftreten des -ϰ- im Griechischen eine Ablauterscheinung darstellt (die später, als das -ϰ- auch auf den Plural ausgedehnt wurde, teilweise analogisch ausgeglichen wurde).

Wenn dem so ist (wie wir hoffen unten im Detail beweisen zu können) so macht es die Mannigfaltigkeit der Reflexe oder Realisierungen sehr unwahrscheinlich, dass wir es beim Auftreten der Pseudosuffixe des Perfektums mit innerhalb der Einzelsprachen erfolgten analogischen Ausdehnungen von Lauterscheinungen bei den Laryngalverben zu tun haben: der Parallelismus zwischen den laryngalauslautenden Basen

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13) Vgl. Ammer, Die Sprache, 2, p. 213.

und denjenigen der abgeleiteten Verben ist zu weitgehend und allgemein im Idg., um der Annahme einer einzelsprachlichen Analogie Platz zu bieten, und in manchen Sprachen (wie z.B. den germanischen) wäre der Boden, auf dem eine solche Analogie erwachsen könnte, zu schmal; andererseits zeigt gerade das historische Griechisch (siehe unten und die Zusammenfassung) eine Tendenz, Formen (wie νενομίδαται, s. unten), die durch den Einfluss eines Laryngals die Erscheinung des Unregelmässigen an sich tragen, eher aus dem Sprachschatz *schwinden* zu lassen als ihre Lauterscheinungen auf andere Verben auszudehnen. Die einzige Analogieerscheinung, der wir, wie schon angedeutet, Rechnung tragen müssen, ist die allen Tempussystemen gemeinsame: das allmähliche Fallenlassen der Abstufung zwischen Singular und Plural; hieraus ergibt sich sekundär das Auftreten von z.B. gr. -ϰ- auch in Pluralformen.

Daher sei im Folgenden die in ihren allgemeinen Konturen umrissene Thesis hier einer näheren Prüfung unterzogen; ist sie diskutabel, so mag eine genauere Untersuchung der Lautbedingungen, unter denen jeder einzelne der „Reflexe" zum Vorschein trat, folgen. Hier jedoch wollen wir uns auf das unmittelbare Objekt unserer Untersuchung, das schwache Perfektum, beschränken, und nunmehr zur Prüfung der Einzeldaten in einigen idg. Sprachen schreiten.

* * *

I. Im Lateinischen findet sich *-u-* als Auslaut eines Perfektstammes nicht nur bei Denominativen, auf *-aui* und *-iui*, sondern auch:

1. Öfters nach Liquida: *uolui*, *ferui*, *fremui*, *serui*, *genui*, *gemui*, *sonui*, *uomui*, *alui*, *furui*, *colui*, *olui*, *tonui* etc.

2. Am Auslaut einer Anzahl von Basen, die von der Normalstruktur durch das Auftreten einer Konsonantengruppe mit-*s*- an zweiter Stelle abweichen: *depsui*, *texui*, *plexui*, *pexui*, *pinsui* usw.

3. Mehrere Male gegenüber *-a-* im Präsensstamm: *cubui*, *strepui*, *domui*, oder gegenüber *-e-*: *habui* und seine bekannte Sippe der „zweiten" Konjugation. Ebenso auch gegenüber *-i-* bei *-a*-Vokalismus: *rapui* zu *rapio*.

4. Nach Vokalen: a) gegenüber nichtaffigiertem Präsensstamm: *pleui*, *triui*, *fleui*, *i*(*u*)*i* (zu *pleo*, *tero*, *fleo*, *eo*); b) gegenüber nasalinfi-

giertem Präsens: *lino* : *liui*, *sino* : *siui* oder *sii*, *cerno* : *creui* 14); c) gegenüber anderen Präsensbildungen: *sero* : *seui* etc.

5. In Basen, die auf sprachvergleichender Grundlage als laryngalauslautend angesetzt werden müssen: *petiui*, *cupiui*. Vielleicht auch für abnormales *quaesiui*. Vergleichende Überlegungen können übrigens auch für die meisten der in 1–4 gebrachten Beispiele herangezogen werden.

Das -*u*-Perfektum ist von den *I*-*S*-*C*-Basen ausgeschlossen (über die Symbole s. oben, S. 361); diese Verben haben entweder reduplizierte Perfekta (*peperci*, *tutudi*) oder solche mit verschwundener Reduplikation (*uidi*, *rupi*), oder haben das idg. Perfektum zugunsten einer Aoristbildung gänzlich fallengelassen (*dixi*, *rexi*).

Für das lat. -*u*-Perfektum ist also die Formel zulässig, dass die -*u*-Charakteristik die Stelle eines laryngalen Basisauslauts einnimmt 15).

II. Im Griechischen haben wir es, wie oben angedeutet, nicht nur mit -κ-, sondern auch mit -δ- zu tun. Um unserer Darstellung der Tatsachen die in derartigen Untersuchungen immer wünschenswerte Synchronität zu verleihen, wollen wir hier Material benutzen, das aus einer einzigen Sprachform geschöpft ist u.zw. aus dem Dialekt des Herodotos.

Das Perfektsystem Herodots enthält noch eine Anzahl Stämme, bei denen -κ- oder genauer [-:κ-] mit Null alterniert, z.B. ἕστηκα : ἑστάναι. Obwohl mit geringerer Regelmässigkeit als im Homerischen 16), ist das -κ- in diesen Basen noch an die Vollstufe gebunden, und im Singular

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14) Wenn wir *liu-i*, *siu-i*, *creu-i* etc. auf Grund von /*liX*-, *siX*-, *krX*-/ analysieren, so sind wir in der Lage, *lino*, *cerno* etc. als die Stämme /*li-n-X*-/, /*kr-n-X*-/ anzusetzen, und auf diese Weise durch Ansetzung infigierter (und nicht suffigierter) Nasalpräsentia eine störende Absonderlichkeit der lateinischen Morphologie aus der Welt zu schaffen; der Weg hierzu ist dem seit de-Saussure für die indische 9. Konjugation gebräuchlichen parallel. Ablauterscheinungen sind bei diesen Präsentien, so wie oft, analog ausgeglichen, aber Reste lassen sich finden: *sp-r-X* hatte im Präsensstamm die Vollstufe /*spr-n-eX*/, d.h. *sperna*-, die Nullstufe /*spr-n-X*/, d.h. *sperni*/*u*-. Hieraus wurde in beide Richtungen Ausgleichung zugelassen: *spernari* und *spernere*, ebenso *sternare* : *sternere*. Das ursprüngliche Paradigma wäre: *sterno*, *sternas*, *sternat*, *sternimus*, *sternitis*, *sternunt*.

15) "A much more disputed formation is the Latin -*v*-perfect. Whatever its origin is, a -*u*- determinative or a glide semivowel, it definitely was not a periphrastic formation". (Lehmann, Language 19, p. 23).

16) Chantraine, Grammaire homérique, I., p. 427.

des aktiven Perfektums und Plusquamperfektums erscheint nur die -*κ*-Stufe: -βέβηκα, τέθνηκα, ἕστηκα, πέφυκε, -βεβήκεα, ἑστήκεε, δεδάηκε (Hdt. 2.165) etc. etc. Die Schwachform ist ihrerseits auf den Plural, das Partizip und den Infinitiv beschränkt 17): προέστατε Hdt. 5.49.2, ἑστᾶσι 1.14.2 etc., -εστέασι 3.62.4 etc., -πεφύασι (v.l. -φυκ-) 2.156.3, ἕστασαν passim, τεθνεώς etc. 1.112, κεχαρηότες (v.l. -ρηκ-) 3.42.4, ἑστεώς etc. 2.151, -βεβάναι 3.146, τεθνάναι 1.31.3, ἑστάναι passim, etc. Ohne Zweifel war es Analogie (s. oben, S. 361), die die Ausbreitung des -*κ*- auf ursprünglich schwache Formen veranlasste: βεβηκυῖα 7.164.1, κεχαρηκότες 3.27.3, -βεβλήκασι 2.131.3.

Die Gruppe der wie beschrieben abstufenden Perfektstämme lässt sich strukturell deutlich abgrenzen; sie enthält: 1. Basen, auf deren Anlaut (*I*) nur ein vokalisches Element (ausser -*o*-) folgt (-βηκ-/-βα-; -στηκ-/-στα-); 2. Basen der Struktur *C*α*S*η-, wobei *S* auch Null, ein zulässiger Vertreter eines laryngalen Sonanten sein kann: -χαρηκ-/-χαρη-, -δαηκ-.

Dieselbe Definition hält auch für die abstufenden Aoriste des Typus -δωκ-/-δο-, -θηκ-/-θε- (vgl. S. 358) stand.

Zu bedeutsameren Resultaten gelangen wir jedoch bei einer Untersuchung der Perfektbildungen mit bis auf das Mediopassivum durchgeführtem Velarreflex. Hier erscheint -*κ*-:

1. Nach jeglichen suffigierten Vokal („schwaches" Perfektum): -ηκ-, -ωκ-, ebenso ι, α (s. unten) die in einem Suffix enthalten sind: νενόμικε, κεκομικώς 9.115.

2. Nach *o*-gefärbtem Vokal einer Basis der oben für das abstufende Perfektum unter (1) angegebenen Struktur: ἔγνωκα (vgl. *nou-i*).

3. In Basen der Struktur *S*α*C*η- (vgl. *C*α*C*η- für abstufende Basen): λελαβηκ-, μεμαθηκ-, ähnlich ἡμαρτηκ-.

4. Nach α unter gewissen Bedingungen, deren Erörterung hier zu weit führen würde: ἐξ(ελ)ηλάκεσαν 5.90.1.

5. Nach nichtsuffigiertem ι und υ : δεδοικώς 1.107.2, δεδυκ-, πεφυκ- (vgl. jedoch πεφυ- oben) 17*a*.

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17) Die übrigen Formen, wie Konj. und Opt. sind auf der vorliegenden Entwicklungsstufe schon periphrastisch.

17*a*) Die Funktion des κ-Lautes in πέφῡκε wird noch deutlicher, wenn man berücksichtigt, dass er dieselbe Stellung in der Wortstruktur einnimmt wie der „glide" *w* in skr. *babh-ūwa* (worauf schon Benfey andeutungsweise hingewiesen hat).

6. Nach Vokalen in Basen, die sich auf Grund der idg. Vergleichung (wie alle übrigen hier angeführten) als laryngalauslautend ansetzen lassen: εὕρηκ-, οἴχωκ-.

So wie lat. *-u-* vom Perfektstamm der *I-S-C*-basen ausgeschlossen bleibt, ist gr. -κ- von ihnen ausgeschlossen, seien diese Basen im Perfektstamm nun aspirierend (πεπομφ-) oder nicht (λελοιπ-), ablautend (s. oben) oder nicht (κεκυφ-). Ausserdem ist das -κ- von allen ablautenden Basen (wie γεγον-) ausgeschlossen. Wie einleitend angedeutet, sind also der Velarverschluss und die *-o*-Stufe komplementär, und eine das Auftreten eines auslautenden -κ- ausschliessende Bedingung ist ein auslautendes *C* der Basis.

Die eben gemachte Feststellung widerspricht der traditionellen Analyse von νενόμικα, da diese Form gewöhnlich als *νενόμιδκα zu νενομίδαται angesetzt und einem Palatalpräsens νομιζε/ο- < *νομιδϳε/ο- gegenübergestellt wird. Jedoch stimmhafte Verschlusslaute werden im Basisauslaut anders behandelt (ἐστοργώς, τέτριγε) und wir finden in der Literatur eine ganze Reihe von Versuchen, diese Verschiedenheit gleichzeitig mit dem Fehlen der dentalauslautenden Basen unter den vor -αται/ο aspirierten Formen (τεθάφαται) einer befriedigenden Erklärung zuzuführen [18]).

Die diesbezüglichen Tatsachen wurden von Kent [19]) nicht besonders gelungen dargestellt. Es stimmt nicht, dass die dentalen Auslaute von der Aspiration ausgeschlossen bleiben, während sich die Aspiration bei anders lokalisierten auslautenden Verschlusslauten vorfindet. Wir haben auch ἀπίκατο mit nichtaspiriertem Auslaut vor -ατο, ebenso -κεχύδαται (mss. DRSVP^1) 2.75.2, ἐσταλάδατο 7.90 mit δ, das bestimmt nichts mit einem Dentalauslaut zu tun hat.

Jedoch all das hat natürlich etwas mit Laryngalen zu tun. Die sonst normale Aspiration vor -αται/ο wird bei laryngalem Auslaut aufgehoben: -ικ- entspricht einer Basis ἱκα- in ἱκανός, und einem nasalinfigierten (vgl. Fussnote 14) Präsensstamm ἵκ-ν-έ-ομαι. Für κεχύδαται vergleichen wir herodoteisches κεχυμένος etc. (1.22.1) und sonstiges griech. κέχυκα; die Basis ist idg. **gh-u-X*, dessen Reflex wir in den skr. Wurzelalternanten *hw-* (*juhwati*, *juhwire* etc.) und *hu-* entdecken, wie auch im griechischen Wurzelaorist ἔχεα (einem Guṇastamm */k*^{h}*ewX-/* χε(Ϝ)α-, wie ἔβη-ν- etc.) [20]). Das δ von κεχύδαται steht an der Stelle des α in ἔχεας, des ∅ in κεχυμένος und des κ in κέχυκε. In ἐσταλάδατο (v.l. ἐστελάδατο) 7.90 folgt der Laryngalauslaut auf *I-S-*. Dieses δ erscheint also in Positionen, in denen andere Verben einen blosen „Hiatus" aufweisen: πεπλέ-αται, ἀραιρέατο, βεβλέατο etc. etc. Eine Form wie βεβλέατο lässt sich jedoch nicht einfach als '*/beblento/*' analysieren, da eine solche Darstellung in keiner Weise den Silbenverhältnissen Rechnung tragen würde: das */-n-/* würde in einer solchen Lautfolge nicht an den Silbengipfel zu stehen kommen. Wir haben daher den Silbenschnitt als selbständiges Phonem zu betrachten; dieses Phonem ist hier mit Null realisiert, aber die Silbenstruktur bleibt bestehen und nach unsilbischem ∅ kommt das */-n-/* an den Gipfel. ∅ ist eine Silbentalrealisierung des Phonems */X/* (*/bebl̥Xnto/*); mir scheint es nun, dass in den geschilderten Talstellungen die Realisierung -δ- in einigen morphologischen Typen zulässig war [21].

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[18]) Es sind mehrere Anzeichen dafür vorhanden, dass diese Aspiration nicht mit dem Typus des aspirierten Perfektums gleichgestellt werden kann. Eine der deutlichsten Anzeichen hierfür ist die Tatsache, dass das φ von τεθάφαται phonologisch nicht als wirkliche Aspirata fungiert: die lectio difficilior τεθάφαται Hdt. 6.103.3 (v.l. τετάφαται) hat viel für sich und zeigt, dass Grassmanns Gesetz nicht mehr wirksam war, als die Aspiration auftrat.

[19]) Language 17, pp. 191s.

Die hier gebrachte Analyse wird sogleich auf zwei Einwände stossen. Deren erster ist die offensichtliche Struktur des Präsensstammes der Verba auf -ίζω, -άζω als einen palatalisierten Dental enthaltend. Hier sind wir aber nun wieder in der Lage, sonst unvergleichbare Morpheme einer idg. Vergleichung zuzuführen. Die griech. Präsentia auf -ίζω, -άζω haben bisher kein passendes Gegenstück im Idg. gefunden, aber wir brauchen uns eines Ansatzes von ζ als palatalisierten Laryngal nicht zu enthalten: ζ stellt */Xy/* dar; das ist eine Darstellung, auf die schon öfters hingewiesen wurde un die schon mehrere Male etymologische Schwierigkeiten gelöst hat [22]).

Sind die Verba auf -άζω, -ίζω also mit einem laryngalen (und nicht mit einem dentalen) Suffix gebildet, so lösen sich mehrere Probleme auf einen Schlag:

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[20]) Der analogische Uebergang von ἔχεα in die Flexion der -σα- Aoriste ist selbstverständlich eine sekundäre Entwicklung.

[21]) Diese Erscheinung ist parallel (wenn auch in umgekehrter historischer Folge) der Entstehung der Formen *'mʌʔn*, *'fɔːʔnait* "mutton, fortnight" etc., die von "a great many people, apparently in all parts of England", deren Sprache nicht als dialektisch bezeichnet werden kann, gebraucht werden (Jones, The Pronunciation of English^3, p. 69s.).

[22]) Lehmann, Proto-Indo-European Phonology, pp. 74 ss.

1. Einem palatalen Präsens steht ein sigmatischer Aorist aus -ισ-, -ασ- gegenüber, während das Perfektum die jetzt schon gewohnten Laryngalreflexe (νενόμι-κ-ε, νενομί-δ-αται, ἐσκευάδαται) aufweist 23).

2. Eine Frage der Dialektbeziehungen innerhalb des Griechischen löst sich auf einfachem Wege: die bekannten dorischen Sigmatempora auf -ιξ- (von Präsentia auf -ιζ-) und auf -αξ (zu -αζ-) sind nun nicht mehr als (sowieso schwach gegründete) Analogiebildungen von Velarverben anzusehen, sondern zeigen einfach vor dem *-s-* des Tempusstammes denselben velaren Reflex des stammauslautenden Laryngals wie *senex, loquax* 23*a*).

3. Im idg. Rahmen stehen nun die Präsentia auf -ζω als einfache Denominative eines Typus da, der der skr. 10. Konjugation entspricht: gr. -ζε/ο- /*-Xy*^{e}*/o-*/ entspricht skr. *-aya-* in *corayati* etc. Andererseits verhalten sich -άζω, -ίζω zu -άω, -έω 24) so wie irgendwelche Palatalpräsenten zu ihren nichtpalatalisierten Gegenstücken.

Dasselbe lautliche (nicht unbedingt semantische) Verhältnis wie

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23) Man muss wohl überdies zugeben, dass *δκ > κ eine merkwürdige Lautentwicklung wäre.

23*a*) Die Geschichte des dorischen ,,ξ'' als Verhärtung von *hs* lässt sich in den Schreibungen des (vorionischen) Namens der Insel Naxos nachweisen. Die ältesten Inschriften geben das Ethnikon als Νάḫσιος, spätere als Νάχσιος, jüngste als Νάξιος. Das hier *ḫ* transkribierte Zeichen ist allerdings mit dem archaischen *h*-zeichen nicht identisch (vgl. Kalinka, AM 17, p. 109, siehe Cauer-Schwyzer, Dialectorum graecorum exempla epigraphica potiora, no. 757–761). Wenn Νάξος = Να*h*σος = /*neXsos*/ ist, so ist es Dialektäquivalent zu νῆσος. So gibt es auch kein Problem der ''intervokalischen'' Erhaltung des σ in νῆσος (Boisacq, Dict. étym., Nachtrag, s/v.), denn in /*neX̮sos*/ (cf. *nare*, s. Boisacq, s/v.) ist es nicht intervokalisch (*X̮!*). Dies entspricht dem Verhältnis der denominativen Signatempora auf -ήσω etc. (*-eX̮so-*) zu Formen wie att. καλῶ (*-l̥X̮so-*). – Weitere Beispiele für ξ: γνύξ neben γόνυ (Hammerich, o.c., p. 36); vgl. auch Fussnote 29.

24) Und nicht -όω, das im allgemeinen als späte Bildung angesehen wird. In diesem Falle mag das -κ-Perfektum vielleicht doch sekundär sein. Der sekundäre Charakter der -όω-Verba drückt sich auch darin aus, dass den ,,Kontrakta'' auf -άω, -έω athematische Typen auf -ᾱμι, -ημι vorausgehen, aber nicht solche auf '-ωμι'. In diesem Zusammenhang ist es wohl nicht nötig, darauf hinzuweisen, dass im historischen Griechisch die Geschichte der -άω-, -έω-Verba Hand in Hand mit der der -άζω-, -ίζω-Verba geht, und wir brauchen die zahlreichen Doubletten dieser Art nicht anzuführen; die Daten mag man in den grammatischen Handbüchern aufsuchen.

zwischen den -άω und den -ίζω- Verben besteht auch zwischen κτάομαι und κτίζω, auf ebenderselben laryngalen Grundlage; κτίζω ist kein Denominativ.

Der zweite Einwand, der gegen unsere Analyse des -δ- im Perfektum gemacht werden kann, ist das Auftreten eines -σ- in Formen wie νενόμισμαι, νενομίσθαι, die ihrerseits wieder den Eindruck erwecken, als ob sie von *νενόμιδμαι, *νενομίδθαι etc. stammten. Hier wieder hat jedoch das Auftreten des -σ- nichts mit Dentalen, sondern mit Laryngalen zu tun, und um das einzusehen, hat man bloss die vielen ,,unetymologischen'' σ im Griechischen ins Auge zu fassen: sie finden sich unter anderem in medialen Perfektformen wie ἀνεγνωσμένος, κεκλησμένος, -κέχωσμαι etc. etc. [25]).

Es können demgemäss auch -σ- oder -δ- die Charakteristiken eines Perfektstammes darstellen, jedoch auf einer Basisstufe, die der mit -κ- verschieden ist. Wir können hier nicht umhin, auf einen anderen Fall hinzuweisen, der uns bei Ansetzung eines Laryngalreflexes in Form von -δ- eine Möglichkeit gibt, eine Schwierigkeit der vergleichenden Morphologie zu lösen: den Fall des griechischen Motionssuffixes von palatalem Charakter, welches skr. *-ī* entspricht. Dieses Morphem, seinerseits älter als der Wechsel des mask. *-o/e-* mit fem. *-ā-*, ist im Griechischen in zwei Formen vorhanden:

1. Das *-i-* kommt nicht in Gipfelstellung, wenn es einem Vokal (z.B. ἰθεία, πεφυκυῖα) oder einer Gruppe *-SC-* (z.B. φύουσα < *φύοντι̯α, χαρίεσσα < *χαρίεντι̯α) folgt.

2. Das *-i-* kommt in Gipfelstellung (wird vokalisiert) wenn es auf *-VC-* (*-VS-*) (z.B. Ἑλληνίς, Θεσσαλιῶτις) oder *-CS-* (z.B. αὐλητρίς) folgt [26]).

Jegliches idg. Phonem, das auf das beschriebene *i* folgt, wird also ein vokalisches Allophon im ersten, ein Talstellungsallophon im zweiten Falle zeigen; dieses Phonem sollte gleichzeitig dem Quantitätselement in skr. *-ī* entsprechen. Es handelt sich um */X/*, in Gipfelstellung als *a* realisiert (Suffix -ια-), in Talstellung als -δ- (Suffix -ιδ-) im Griechischen, als Länge (im Auslaut), bzw. als *y* (im Inlaut), im Indischen 27).

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[25]) Anlautender Laryngal kann auch zu ,,unstabilem'' *s-* geführt haben; vgl. Hoenigswald, Language 28, p. 182 ss. Aehnlich zieht Martinet (BSL 51, p. 56) das Verhalten der Laryngale im Wortanlaut und unter gewissen Sandhibedingungen zur Stützung seiner Annahmen heran.

[26]) Die Verteilung der beiden Varianten des Suffixes nach dem Silbenverlauf erinnert irgendwie an die Varianten des *-ia*-Nominalparadigmas im Gotischen. Manche Stufen des Griechischen kennen nach *-CS-* auch gegenteiligen Silbenschnitt: -τρια, hierher auch πότνια.

Martinet 28) zeigte, dass das *-ic*-Element in *uictrix* etc. (*uictor* : *uictrix* = αὐλητήρ : αὐλητρίς) auf denselben Ursprung hinweist; so sind also die beiden Bildungstypen vom idg. Gesichtspunkt identisch und stimmen zum skr. *-ī*.

Wenn hier dem gr. -δ- lat. *-c-* entspricht, so können wir vielleicht eine andere Entsprechung in nicht abgeleiteten Nomina erwarten: κλῄς, -ηδός zu *clauis* zeigt lat. *-u*-Reflex neben griech. -δ- 29).

Diese Uebersicht der Laryngalreflexe in griechischen Verbal- und Nominaltypen abschliessend, lässt sich sagen, dass hier leichter als in jeder anderen Sprache die eingangs angedeutete phonologische Irrelevanz der Lokalisierung des Reflexlautes zum Ausdruck kommt. Ziemlich deutlich liegt der Fall in Bezug auf ζ; dieses ist die palatalisierte Realisierung von */g/* wie auch von */d/*, und palatalisiertes */b/* gibt es im historischen Griechisch nicht. Wenn es sich nun auch als palatalisierter Verschlusslaut laryngaler Natur erweist, so haben wir ein schönes Beispiel vor uns, wie die Lokalisierungseigenschaften unter Palatalisierungsbedingungen neutralisiert werden. Der Phoneminhalt des beschriebenen ζ wird daher für uns nicht mehr sein als ,,palatalisierter Verschlusslaut''.

Σ war, zumindest auf einer der früheren Entwicklungsstufen des Altgriechischen, eine kombinatorische Variante des *h*, und konstituierte mit dem letzteren ein Phonem, unter dessen relevante Eigenschaften Lokalisation nicht zählte. Es ist blosser ,,Hauch'', wie italisches *f*, einstiges Allophon von *h*, und historisch die Charakteristik des umbr. *-f-* Perfektums (s. unten).

Um den -δ-Reflex auf ähnliche Art anzusetzen, müssen wir seinen morphologischen Status festlegen. Was die vor den Endungen -αται, -ατο erscheinenden Aspiraten betrifft, so können diese ceteris paribus als wurzelkontrastierende Elemente fungieren: τετάχαται opponiert

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27) Trotz Pedersen, La cinquième déclinaison, p. 30. Die Annahme, dass -ιδ- zu mask. -ιδᾱ- gebildet worden sei, ist unüberzeugend.

28) BSL 51, p. 53.

29) Die Wurzel lässt sich nicht leicht eindeutig ansetzen, wir haben ja auch lat. *claudere*. Aber die Mannigfaltigkeit der Laryngalreflexe kommt auch hier zum Ausdruck: das Dorische kennt auch κλᾴξ, κλᾳκός mit Velarreflex, vgl. oben (S. 367) über die Verba auf -ίζω.

τεθάφαται (τετάφαται). Dies ist jedoch nicht der Fall bei δ, welches der einzige „stimmhafte" Verschlusslaut ist, der in dieser Stellung ans Licht tritt. Zumindest hat seine Lokalisierung also keine morphologische Funktion. Dieses -δ- ist funktionell nur ein „stimmhafter Verschlusslaut", eine wirkliche Verhärtung einer „Glottisöffnung" oder eines „Silbenschnitts", passende Phoneminhalte für die historischen Reflexe eines idg. Laryngals 29a).

III. Noch bedeutungsvoller ist die Untersuchung des hier gestellten Problems in einer germanischen Sprache, ist dies jedoch derjenige Zweig des Idg., der den Begriff des schwachen Perfektums schaffen half. Wenn wir als Beispiel das Gotische heranziehen, so bildet die Charakteristik des schwachen Präteritums das folgende Paradigma:

Ind.	Opt.
nasi-da, -des, -da	*-dedjau, –, -dedi*
-deduts	
-dedum, -deduÞ, -dedun	*-dedeima, -dedeiÞ, -dedeina.*

Ein vollkommen gleiches Paradigma ist das des Verbums „gehen" (vgl. die skr. Wurzeln *i-*, *yā-*, idg. **XiX-*, vgl. lat. *iui*): *iddja, iddjedun,* dessen *-ddj-* als „Verschärfung" wohlbekannt ist und schon lange als Laryngalreflex gekennzeichnet war 30). Die spezifische Lautgestalt *-ddj-* scheint auf (progressive) Palatalisierung zurückzugehen (im Vergleich mit dem einfacheren *-d-* des schwachen Präteritums). Eine weitere laryngalauslautende Basis mit schliessendem *-d-* ist *wilda, wildedi,* vgl. lat. *uolui* 30a).

29a) Setzen wir hierzu noch das [*r*] in den Formen des indischen Verbums für „liegen", besonders in *śerate, aśerata,* aber auch in *śeratām,* (ved.) *aśeran* etc. Morphologisch steht dieser [*r*]-Laut dort, wo δ in νενομίδαται etc. steht. Phonologisch jedoch ist er eine stimmhafte Variante eines Phonems, dem auch der traditionell *h* transkribierte Hauchlaut angehört und das keine relevante Lokalisierung beinhaltet. In der genau entsprechenden griechischen Form steht an seiner Stelle ein phonemischer Silbenschnitt, der die Gipfelstellung des Nasals in der Personalendung aufrechterhält: ἐκέατο.

30) Smith, Language 17, p. 93 ss. und andere, darunter Sturtevant, l.c.

30a) Auch die Präterita der „Präteritopräsentia" brauchen nicht unbedingt alle sekundär mit regelmässig gewordenem Dental gebildete Formen zu sein. *Kunþa,* (vgl. ἔ-γνω-κ-α, *no-u-i*), *munda* (-μνη-) und *skulda* sind den hier be-

So trifft es also auch auf das Germanische zu, dass ein Laryngalreflex (der überdies nicht notwendig dental realisiert zu werden braucht vgl. got. *twaddje*, altnord. *tueggia*, Null in ahd. *zweio*, vgl. engl. *egg* mit lat. *ouum* etc.) [31] neben Laryngalbasen auch im schwachen Perfektum erscheint und dort ein Pseudosuffix zu Tage fördert, das schon so manchem nicht unbeträchtliches Kopfzerbrechen verursachte [32].

IV. *F* ist der hier in Frage kommende Laryngalreflex im Umbrischen, einer Sprache, deren Textcorpus einen noch kleineren Umfang als das des Gotischen besitzt. Die wenigen Daten, die uns dieser Dialekt liefert, stimmen jedoch zum oben Dargelegten. Die Perfektform *pihafi*, einem Denominativ von einem dem lat. *pius* entsprechenden Adjektiv [33], steht neben *herifi*, zu dem wir ein Präsens *heri* „oportet" besitzen. Das letztere hat die idg. Wurzel *_g_^{h}_-r-X_, cf. gr. χρή, χρησ-τός über dessen -σ- s. oben, S. 368 [34].

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leuchteten morphophonologischen Bedingungen konform. Es mag sich um ein ursprüngliches Paradigma folgenden Art gehandelt haben: *man*, *_mant_, *_man_, *mundedum*, *_mundeduþ_, *mundedun*, das sekundär in zwei getrennte volle Paradigmen verallgemeinert wurde. Der Vorgang wäre parallel dem für lat. *sternare* / *sternere* gezeigten (Fussnote 14), nur dass im Gotischen die Differenzierung morphologisch und nicht lexikalisch resultierte. Ohne genauere Erklärung bleibt weiterhin *brahta* neben den teilweise vielleicht doch sekundären *wissa*, *aihta*, *ohta*, *mauhta*, *þaurfta*. – Germanischen Dentalreflex zeigt auch got. *gamunds*, sowie die Vertreter der idg. Wurzel *g-n-X*: *himina-kund-s* etc., *kind-ins* „General". Die Basisstufe ist ähnlich der des schwachen Perfektstammes, vgl. -γ(ο)νος. In den genannten Nomina nimmt der Dental die Stelle der von Lehmann, Proto-Indo-European Phonology, p. 64, vermissten idg. Länge ein.

[31] Siehe Fussnote 30.

[32] „OS *đeđa* 'did' may be parallel to ἔθηκα". (Sturtevant, l.c.) nähert sich unserer Lösung. Die Geschichte der Forschung ersehe man bei Must, Language 27, pp. 121 ss. – Ich bin jedoch nicht in der Lage, das Auftreten zweier *-d-* in den Schwachstammformen (plur., opt.) zu erklären; keine zufriedenstellende Erklärung wurde jedoch bisher auf Grund irgendeiner Theorie geliefert.

[33] *Pihafi* und *herifi* werden gewöhnlich als Konjunktive bezeichnet, weil sie ein *-i* haben und nach Konjunktionen gebraucht werden, deren lateinisches Equivalent, *priusquam*, nach dem klassischen Sprachgebrauch einen Konjunktiv hinter sich haben soll. Was diese Formen wirklich sind, hoffe ich demnächst zeigen zu können.

[34] Vgl. Pedersen, La cinquième déclinaison, p. 73.

Eine weitergehende Untersuchung noch anderer Sprachsysteme, wie z.B. des Hethitischen auf seine *-hh*-Formen, wäre wohl imstande, zu ähnlichen Resultaten zu führen; indes wollen wir uns mit dem Gebotenen begnügen. Leider – oder vielleicht glücklicherweise – kann uns das Sanskrit keine Parallelen bieten, da seine denominativen Perfekta periphrastisch (*cintayām āsa*, *cakāra* oder *babʰūwa*) gebildet werden. Das ist nun nicht eine urtümlich zusammengesetzte Tempusform, die den Anlass zu späterer Agglutination geboten hat, sondern, im Gegenteil, eine sekundäre Entwicklung: das Vedische kennt nur eine einzige Form dieses Typs: *gamayām cakāra*. Dies entspricht, wie es scheint, der allgemein giltigen Tendenz im Idg. ,,Abwegige'' Formen, wie die frühgriechischen auf -ίδαται, werden fallengelassen und in Bälde durch periphrastische ersetzt (attisch νενομισμένοι εἰσίν) 35). Dieser Prozess vollzog sich um so leichter, wenn die Sprache nicht auf einem Dreiersystem der Aspekte besteht: das Lateinische hatte leicht die Möglichkeit, ein unbequemes Laryngalperfekt durch einen idg. Aorist zu ersetzen (vgl. oben, S. 363), und im Indischen, wo eine Reihe von Präteritalbildungen ohne bemerkenswerten Sinnunterschied zur Verfügung standen, konnten plumpe und nur wenige Parallelen besitzende Formen leicht absterben, ohne dass dieser Vorgang der Ausdrucksfähigkeit der Sprache Abbruch tat. In allen hier untersuchten Sprachsystemen überlebte derjenige laryngale Perfekttypus, welcher der gebräuchlichsten Art der Laryngalbasen, den Denominativen, analog war. Ueberall wurde dieser Typ zum ,,regulären'', nur er konnte fruchtbar bleiben, während die anderen Typen ihr morphologisches Todesurteil hinnehmen mussten.

Aber keineswegs bestand in den frühen Stadien idg. Sprachentwicklung eine Zweiheit der Perfektbildung: es gab keine suffigierten neben ablautenden Basen. Das Ableitungssuffix (laryngaler Natur) war der Abstufung unterworfen; so wie die Abstufung die Verbalwurzel berührt, sooft diese mit dem grammatischen Suffix in unmittelbare Berührung kommt, aber beim Nomen das Ableitungssuffix und nicht die Wurzel in Mitleidenschaft zieht (z.B. die idg. Abstufung **-ti-/-tei-* des Suffixes der Nomina Actionis), so war auch das Ableitungssuffix des Verbums dem betreffenden Aspektstamm gemäss der

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35) Der Vorgang vollzieht sich schrittweise. Vgl. Schwyzer, Griechische Grammatik I., p. 812, und meinen demnächst im Museum Helveticum erscheinenden Aufsatz ,,Die 'zweiten' Tempora des Griechischen'', § II.A.I.

Abstufung unterworfen. Die Basisstufe des Perfektums der laryngalen Wurzelverba war dieselbe wie die der laryngalen Denominativsuffixe. Dieser Parallelismus erklärt sich also strukturell und nicht als sekundäre Analogie.

Wenn wir uns nun der Annahme einer ursprünglichen Suffixbildung der hier untersuchten Tempusstämme widersetzen, so erledigt sich hiermit von selbst jedes Problem einer eventuellen Agglutination, die im Hintergrund einer solchen Suffixbildung hätte liegen können. Dass wir unsere Analyse auch auf das germanische schwache Präteritum ausbreiten konnten, diejenige Tempusstammbildung, die oft als das Bollwerk der klassischen Agglutinationstheorie angesehen wird, verleiht unseren Überlegungen auch eine über die speziellen Details hinausgehende allgemeinsprachwissenschaftliche Bedeutung.

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THE VERBAL SYSTEM OF SRANAN [1]

§ 1. Introduction.
§ 2. Verbal forms characterised by prefixes.
§ 3. A verbal form characterised by intonation.
§ 4. The verbal chain.
§ 5. The auxiliary verbs.
§ 6. Transitive and intransitive use of the verb.

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§ 1. INTRODUCTION

In the existing literature a great many contradictory opinions and theories are to be found concerning the verbal system of Sranan. The authors have often contented themselves with "translations" into Western tense-categories, whilst the attempts to break away from the traditional division into tenses have been undertaken on highly contestable linguistic material.

Our startingpoint in this study is a varied text, noted down mechanically. Mr. R. Kapel, a fitter who lived in Holland during a few years, told us during one hour without any preparation about his life, during a visit in October 1954 to the Bureau for Linguistic Research in Surinam of Amsterdam University. This was recorded by means of a wire-recorder. Between October 1954 and February 1955 I personally noted down the contents of the reel; another listener-in was Miss U. M. Lichtveld, assistant for the teaching of Netherlands linguistics at Amsterdam University in aid of linguistic research in Surinam. Both she and Mr. Kapel helped me in interpreting the text; when in February 1955 Mr. Kapel returned to Surinam, Miss Lichtveld continued to assist me as an informant. Although she comes from a different social environment than Mr. Kapel, she proved to be a very capable informant, conscious of the differences in the use of language between the different social classes. I owe a great deal to her assistance. The linguistic material she provided was checked again with other informants, among whom Mr. W. A. Sarucco, who came from the same environment as Mr. Kapel, deserves special mention.²)

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[1] On the advice of Professor Dr R. A. J. van Lier I will use the name Sranan in stead of the name *Sranan Tongo* I used formerly as the name for the Negro-English of Surinam. Cf. also the German term *Srananisch*, introduced by Heinz Kloss in his work *Die Entwicklung neuer germanischer Kultursprachen von 1800 bis 1950*. München, 1952.

A closer study of the recorded text clearly showed that the description of the verbal system of Sranan was still very inadequate; newly discovered facts compelled us to a thorough revision of earlier views.³)

In Sranan we found a group of words (here called verbs) which can occur accompanied by the prefixes *ben-*, *sa-* and *e-*, and combinations of these prefixes. Each verb proved to occur in eight verbal forms, characterised by certain prefixes or combinations of these. The form without a prefix could also be placed in this system which is treated in § 2. Beside these we also found an unprefixed form in sentences with a different intonation curve; this latter form which falls outside the system of forms characterised by prefixes, finds treatment in § 3.

Following an identical subject, several verbs together can express a complex action. Such a series of verbs will be called a *verbal chain*; it will be treated in § 4. Certain verbs have certain formal characteristics in common, by which they are different from the other verbs. These verbs we call *auxiliary verbs*; they will be treated in § 5. Finally, the transitive and the intransitive use of verbs will be discussed in § 6, in connection with the differentiation in Sranan between active and passive.

§ 2. VERBAL FORMS CHARACTERISED BY PREFIXES

We call verbs all those words in Sranan which occur or which may occur accompanied by the prefixes *ben-*, *sa-* and *e-*, or the combinations of prefixes *ben-e-* (or *be-e-*), *ben-sa-*, *sa-e-* and *ben-sa-e-*.⁴)

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²) This study was undertaken at the order of WOSUNA (Wetenschappelijk Onderzoek in Suriname en de Nederlandse Antillen, i.e. Scientific Research in Surinam and the Netherlands Antilles), under the supervision of Professor Dr W. Gs Hellinga and Professor Dr A. Reichling, both of Amsterdam University. Professor Hellinga has shown a close interest in the work and it is to his help that I owe the solution of many problems.

³) See J. Voorhoeve, *Voorstudies tot een beschrijving van het Sranan Tongo, Negerengels van Suriname* (Preliminary studies for a description of S.T., the Negro-English of Surinam). Amsterdam, 1953.

⁴) The two last-mentioned combinations of prefixes seem to occur only rarely. We did not observe them in the recorded material, but found them

By means of these prefixes and their combinations eight verbal forms are constructed. The unprefixed form of the verb is a negatively characterised form within this system. The verbal paradigm therefore becomes:

$$\text{subject}\left\{\begin{array}{lll} \textit{ben} - & \textit{sa} - & \textit{e} - \\ \textit{ben} - & \textit{sa} - & \\ \textit{ben} - & & \textit{e} - \\ & \textit{sa} - & \textit{e} - \\ & \textit{sa} - & \\ & & \textit{e} - \\ & \text{[zero]} & \end{array}\right\}\text{verb}$$

We will now try to approach the value of these eight categories by means of the verb *waka* (to walk). The unprefixed form represents a perfect or an imperfect past tense (*mi waka*, I have walked, I walked). The form with the prefix *e-* represents imperfect present tense (*m e-waka*, I walk), often with the meaning of a durative or an iterative: I am walking, I usually walk, I often walk. The form with the prefix *sa-* denotes the future (*mi sa-waka*, I shall walk). The addition of *e-* adds a durative or iterative element to the action (*mi sa-e-waka*, I shall walk regularly). The form with *ben-* can be considered as a perfect, the form with *ben-e-* as an imperfect past (here again often with a durative or iterative character). The verbal form with *ben-sa-* indicates a past future, whilst the further addition of *e-* renders the action durative or iterative.5)

We should stress again our definition of the verb: every word to which the above mentioned prefixes can be added is a verb, hence also words like *nati* (to be wet), *hebi* (to be heavy), *siki* (to be sick), *kba* (to be ready), *nen* (to be named), *de* (to be), etc. Many of these verbs are

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due to questions put to the informants. They were not yet mentioned in the literature. The prefix *e-* is often confused in the literature on the subject with the independent verb *de* (to be), because in emphatic speech this prefix may assume the form *de-*. In a synchronic description we should take care to keep the prefix *e-* (occasionally *de-*) clearly apart from the verb *de*.

5) We purposely only give a "translation" into occidental tense-categories for a verb like *waka* (to walk). Important divergences are to be found for verbs like *lobi* (to love). What precedes is a reproduction of the views of traditional grammar; divergences are treated as exceptions. Based on the numerous divergences we shall try to reinterpret the tense system outlined above.

translated into European languages by means of adjectives and this is the reason why in the existing grammars of Sranan they are wrongly considered as adjectives.

Whether a word in Sranan is a verb or not is only proved by the existence of the possibility to combine it with prefixes and to link it with other words.[6] In this way we find *nen* as a noun (with the meaning: name) and as a verb (meaning: to be named, to be called). As a verb it can be the startingpoint for the prefixed verbal forms mentioned above (*a ben-nen*, he was called), as a noun it can be i.a. combined with a preceeding article and a following demonstrative (*a nen disi*, the name this = this name). Hence *siki* can be a noun (meaning: sickness), an adjective (meaning: sick), an intransitive verb (meaning: to be sick or ill), and a transitive verb (meaning: to make ill).

When we compare the value of the unprefixed form *waka* (have walked) with that of *nati* (am wet), or *nen* (am called), we observe very soon that our approximation of the value of the verbal categories by way of the occidental tense-system was quite imperfect. The unprefixed form of the verb appears not always to agree with the occidental perfect, whilst the form prefixed by *e-* does not always agree with the present. We will now oppose a number of verbal forms prefixed by *e-* with some unprefixed forms, in order to learn the value of the forms through comparison.

a e-dede he dies	*a dede* he is-dead
a sant e-kba the sand gets-ready (it has been nearly cleared away from the truck)	*a santi kba* the sand is-ready (it has been removed from the truck)
a watra e-trubu the water becomes-troubled, turbid	*a watra trubu* the water is-troubled
a e-dipi tumsi it gets-depth too-much (it is becoming too deep)	*a dipi tumsi* it is-deep too-much
m e-wan waka I want-generally to-walk	*mi wan waka* I want to-walk

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[6] This point is to be treated in greater detail in an article to be published in *West-Indische Gids*.

i m·a e-kan e-was a kros dj i·
your mother can-all-the-time continue-to-wash the clothes for you
i m·a kan was a kros dj i·
your mother can wash the clothes for you
i n e-sab f a mon e-du kon
you not know-all-the-time how the money actually comes
i no sab f a mon e-du kon
you not know how the money actually comes
pe Srnaman e-de j a moro prisiri
where Surinam-people are-ever you have more pleasure (fun)
pe Srnaman de j a moro prisiri
where Surinam-people are you have more fun
a e-sabi pasi kba
he begins-to-know the-road already
a sabi pasi kba
he knows the road already

Here we have assembled some examples where the difference between the verbal forms with and without the prefix *e-* evidently does not indicate a difference in tense. The difference is one of aspect. Judging by a few of these examples we see how the prefix *e-* successively functions to indicate an imperfective, an iterative, a durative, a progressive and an inchoative aspect. All these mutually different values have in common that the action is considered independent of the result. It is the unprefixed form which reveals the result of the action. For this reason we call the prefix *e-* the indicator of the *non-completive aspect.* Also when prefixes are combined, *e-* indicates this non-completive aspect, as is shown by the durative or iterative value of the forms prefixed with the combinations *ben-e-*, *sa-e-* and *ben-sa-e-* (see above). The absence of the prefix *e-* – also in case of the unprefixed form of the verb – indicates the *completive aspect. a ben-e-waka* (or *a b-e-waka*) = he walked (he was walking, he did nothing but walk, he used to walk); *a sa-e-sabi pasi noo* = he will-presumably-somehow-know the road now.

It is understandable that it is the verbs like *nati* (to be-wet), *nen* (to be-called), *abi* (to have), *de* (to be), etc., where the unprefixed form agrees with an occidental present,[7] whilst the unprefixed form of verbs like *waka* (to walk) agrees with an occidental perfect. This is because the former in our language only indicate a state of being and possess a completive meaning. As our present tense of these verbs has a completive meaning, we find that the unprefixed form of these verbs in Sranan corresponds to our present tense. For verbs like *waka* on the contrary our present does possess a non-completive meaning and for this reason we find the verbal forms prefixed by *e-* to correspond to our present tense.

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[7] These are all verbs corresponding with our adjectives and adverbs, nearly all enumerated in A. Donicie, *De Creolentaal van Suriname. Spraakkunst. Met*

Before we continue to discuss the value of verbal forms prefixed by *sa-*, we shall have to remove a persistent misunderstanding to be found in grammars of Sranan. It has always been assumed that the occidental tense-category of the future must also be found in Sranan. It is possible to render the occidental future in Sranan by means of *sa-* + verb and by means of *e-go* + verb. The formal difference between *sa-* as a verbal prefix and therefore part of a word, and *go*, the verb "to go" and therefore an independent word, was not known. This led to a comparison of these two constructions without realising that these were incommensurable forms. This led again to the view that Sranan possessed two future tenses. R. D. Simons [8]) calls these respectively *futurum remotum*, formed by means of *sa-*, and *futurum proximum*, formed with *go*. Father Donicie [9]) calls these a future tense without and one with an affective relation to the present.

Since we have learned to consider *sa-* as part of a word (prefix), it is no longer possible to describe the verbal group *e-go* + verb as a category within the system of the verbal forms (formed by prefix + verb), even though in actual fact *e-go* + verb might completely describe the verbal form *sa-* + verb. Occasionally the verbal form *e-* + verb may be described by the verbal group *e-kon* + verb; *m e-kon nati* and *m e-nati* both mean "I get wet." [10])

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medewerking van W. Campagne, Ph. van Daal e.a. (The Creole language of Surinam. Grammar. With the collaboration of W. Campagne, Ph. van Daal and others). Paramaribo, 1954, p. 57.

[8]) R. D. Simons, "Het partikel sa in het Surinaams", (The particle *sa* in the Surinam language), in *West-Indische Gids* XXXV (1954) pp. 166–170.

[9]) A. Donicie, op. cit., p. 50.

[10]) This problem is treated in my contribution to an article by A. Donicie, De partikels *sa* en *(de) go* in de Creolentaal van Suriname (The particles *sa* and *de* *(go)* in the Surinam language). *West-Indische Gids* XXXVI (1956) pp. 183–191.

The form with prefixed *sa-* is still generally considered as a future tense, and in actual fact our future tense can often be rendered by means of *sa-* + verb, but less than one would expect in view of written Sranan. In our recorded text we found comparatively very few *sa-*forms, *e-go* + verb being much more frequent. Moreover, we found *sa-*forms which in no way agreed with our future tense.

Our informants were originally of the opinion that the *sa-* forms and the verbal group *e-go* + verb might be used interchangeably with only a slight difference in meaning.[11] When we tried this out with a number of sentences, it proved suddenly impossible with the following sentence:

i sa-kmopo , ma j e-go misji kune[12]
you will-come-up , but you go miss still

In this case *sa-* and *e-go* can definitely not be interchanged. *e-go* had to be used in the second part of the sentence, because otherwise this would lose its threat. In the first phrase *sa-* had to be used, because otherwise this would lose its hypothetical nature. A free translation of this sentence was as follows: "Even if you do your utmost, you will still miss the ball." Also in those cases where the *sa-* forms correspond with our future tense, Sranan uses the *sa-* form rather in order to express a wish, an intention or an expectation of the subject than a future tense; see for instance the following examples:

m sa-teki Streeteresserlimonade
I take Streeteresser lemonade (in reply to the question: "What will you drink?")

Luku na mofo na oro , efu ju no sa-si Konkoni[13]
Look in mouth in hole, if you not see Konkoni (= whether perhaps you don't see Konkoni)

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[11] They were of the opinion that *e-go* + verb made the action more concrete, more direct. Hence this agrees with the difference, approximated in different ways by Simons and Donicie by means of their terminology.

[12] *Kmopo* is used here for a goal-keeper who distinguishes himself from his fellow-players due to some particular feat. *Kune* is a Papiamento word. This sentence was supposed to have been spoken by a person from Surinam who due to his long stay in Curaçao interlarded his conversation with Papiamento words and expressions.

[13] This example was already discussed on p. 63 of my *Voorstudies* (cf. note 3). On the advice of our informants we translated the prefix in a dubitative sense (by "perhaps"). Father Donicie translated it in the same example by means of "can" (i.e. as a potential), cf. Donicie's article mentioned in

m sa-tak nang a bakra
I shall-talk with the whiteman (in this case *e-go* may be used in stead of *sa-*)

These examples are not very striking and possibly one might continue to consider *sa-* here as the indicator of the future tense. The argument only becomes convincing when we observe *sa-* forms which it is impossible to consider as indicative of the future. We have been able to find such examples.

mi wins a kon tamara
I wish he came tomorrow (= I wish that he would come tomorrow)

After *winsi* the thing wished for – even though it is in the future – can only be expressed in its completive aspect, that is to say as the result. Unless, as is the case in the following example, the verb *winsi* itself assumes the *sa-* form:

mi sa-wins a e-kon tamara
I only-hope he come tomorrow

The desired object can only be represented as non-completive or in the process of becoming when the wish itself – with an optative value – is placed outside the concrete occurrence by means of the prefix *sa-*.

Abeni taki: Janus, u mu suku wan fasi fu wi libi noo.
Abeni said: Janus, we must seek one way for we live now.
Janus sa-piki Abeni, taki: mi abi wan ooru djakti
Janus replied Abeni, said: I have an old coat

According to Father Donicie who provides more examples of this use of *sa-*,[14] the prefix *sa-* is used here by way of an introduction to a new phase of the story. His explanation of this phenomenon follows that of Herskovits[15]; it is that the story-teller still dwells on the preceding action and therefore considers what follows as the future. Here he uses

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note 10, p. 184. We hope to be able to show later that *sa-* indicates the *modus non-realis* which includes both the dubitative and the potential. The difference in the interpretation provided by the informants was therefore only apparent.

Another example treated on the same page of my thesis was refuted very cleverly by J. A. G. Koenders in his monthly *Foetoe-boi* VIII (1954) 11. The form *sa-* occurring in this example was not a verbal prefix, but a contraction of *so* (so, thus) and *a* (he).

[14] A. Donicie, op. cit, p. 52.

[15] M. J. and F. S. Herskovitz, *Suriname Folklore. With Transcriptions of Suriname Songs and Musicological Analysis by Dr. M. Kolinski.* New York, 1936, p. 119.

the term prospective aspect. We are, however, of the opinion that this explanation is not quite correct. This use of the *sa-* form is only rarely found, not even in stories. The prefix is certainly not used in all cases where a new phase of the story starts, whilst in those cases where it does occur, it is not always clear why a new phase of the story should start in this very place. We would prefer to connect this use of the prefix *sa-* with its use in sentences like the following:

I sa-go taig a man dati?
You have-gone tell the man this? (= You've been really so stupid as to tell this to that person?)

The use of *sa-* in this case can only be explained from the indignation of the speaker. Indignation causes doubt about the occurrence of the action. In the same way the use of the prefix *sa-* in the previous example may express the amazement or astonishment of the speaker about the action he reports. One of our informants translated the sentence as follows: "Janus is then supposed to have said: I possess an old coat." The informants themselves did not use *sa-* in the way indicated by Donicie and for this reason they were unable to provide other examples.

The verbal form with the combination of prefixes *ben-sa* generally indicates an irrealis:

ef a ben-kon esde, m ben-sa-aks en dati
if he been-come yesterday, I would-have-asked him that
ef oto no ben-de, m ben-sa-e-waka te m n a futu
if automobiles not existed, I would-walk until I not have feet
moro
more (= if there were no cars, I would have done all this on foot until I had no more feet)

Finally we may add that according to Father Donicie the prefix *sa-* in Saramaccan (a related dialect of the Maroons) and occasionally even in Sranan has to be translated by means of the verb "can," i.e. a potential.[16])

When surveying the examples, which are rather scarce as we would only be able to adduce examples of the same order, it becomes clear that our future tense is actually reproduced occasionally by means of the verbal form prefixed by *sa-*, but more often by the verbal group *go* + verb. It is impossible to replace the verbal form with the prefix

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[16]) A. Donicie, p. 186 of the article quoted in note 10.

sa- by means of the verbal group *go* + verb when the action is seen as hypothetical. The verbal form prefixed by *sa-* is used moreover as a dubitative, a potential, an optative and an irrealis. For this reason we consider the prefix *sa-* not as indicative of the future, but as indicative of the *modus non-realis*; evidently this mode partially coincides with our category of the future tense.

The prefix *ben-*, finally, is a clear indicator of tense; it indicates those actions which occur in the past.

m ben-nati; *m b-e-nati* ; *mi nati* ; *m e-nati*
I was-wet; I became-wet; I am-wet; I become-wet
m ben-lobi en ; *mi lobi en*
I loved him; I love him
m ben-waka ; *mi waka* ; *m b-e-waka* ; *m e-waka*
I had-walked; I have-walked; I walked, was walking; I walk, am walking

Combined with the prefix *sa-* (*ben-sa-*) it indicates the irrealis: past + non-realis = irrealis. The combination of the prefixes *ben-sa-e-* indicates an irrealis with a non-completive (in this case: durative or iterative) aspect.

The three verbal prefixes *ben-*, *sa-* and *e-* each indicate by their use or their absence respectively two tenses, two modes and two aspects of the action. *Ben-* and *zero* produce the temporal categories of past and present, *sa-* and *zero* the modal categories *non-realis* and *realis*, whilst the prefix *e-* or its absence denote the aspect-categories non-completive and completive. As already shown above, these three prefixes, their mutual combinations and the *cas zéro* (the unprefixed form of the verb) result in eight verbal categories, which may be arranged in the following scheme:

		tempus			
		past	present		
mode	realis	*ben-*	[zero]	completive	aspect
	non-realis	*ben-sa-*	*sa-*		
	realis	*ben-e-*	*e-*	non-completive	
	non-realis	*ben-sa-e-*	*sa-e-*		

§ 3. A VERBAL FORM CHARACTERISED BY INTONATION

In the foregoing paragraph we found an unprefixed form of the verb, which like all other verbal forms was fully determined in three ways: tense present, mode realis, aspect completive. It became clear, however, that a verbal form without prefixes could also occur in a completely different way:

wè , da j g a masra Jan !
well, then you go to master John!
A taki: *i wroko no* !
He said: you work only!
Wè , u kon , u g a tap a stadjon !
Well, you come, you go to on the stadium!

This verbal form is only to be found after a 2nd person singular or plural. Moreover, there is a clear difference in the intonation of the sentence (symbolised here by the period and the exclamation mark) in the following two examples:

da j g a masra Jan !
then you go to master John!
da j g a masra Jan.
then you have-gone to master John.

The intonation curve in the exclamatory first sentence appears to be identical with the intonation of imperative sentences without a subject
g a masra Jan !
go to master John!

In case of the imperative the subject (always in the 2nd person sing. or pl.) may or may not be mentioned. In that case the imperative formally coincides with the unprefixed form of the verb. However, the imperative is only used in sentences with an imperative intonation. The unprefixed form of the verb (*cas zéro*) cannot be used in sentences with this type of intonation.17)

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17) It is, however, possible to use this verbal form in sentences with a greatly similar intonation:
mi nján wan aleesi!
I have-eaten one rice! (= and a lot of rice I had there!).

The intonation of the imperative sentence greatly resembles that of the emotional exclamation of which the foregoing sentence is an example, In both sentences the verb is heavily stressed. At the end of the sentence, however, a difference is to be noted: in the exclamation the voice retains the same altitude

§ 4. THE VERBAL CHAIN

It is possible in Sranan to combine different actions within the unit of one sentence. We distinguish the following possible constructions:

1. S_1 V_1, (conjunction) S_2 V_2
2. S_1 V_1 O_1 $(= s_2)$ V_2.
3. S_1 V_1 V_2.

The second type of construction is the ἀπο κοινου-construction which occurs frequently in Sranan. A noun or a pronoun which belongs to the first verb as either object or definition is the subject of the second verb:

da j bj-abi Waaldijk be-plei n ini Sabaku
then you had Waaldijk played in Sabaku
u b-e-go bai kronto dap a wan ooru frow b-e-sdon a
we went buy coconuts there at an old woman sat at
skoinswinkel
"skoin"-shop

In the first two types of construction V_2 is an independent verb, not subordinated to V_1. Hence, V_2 may assume all verbal forms, as is clearly evident from the examples. Matters are different for the third type of construction, an example of which follows.

a b-e-waka seri sani na strati
he walked sold things in street (= he went peddling things in the streets)

The verb *seri* can only occur in the unprefixed form,[18] although its tense, mode and aspect are determined by the form of the verb *waka*. This means that in this type of construction the following verbs are dependent on the first, but this does not allow us to consider *waka-seri* as a verbal combination. The verb *waka* may be followed by a determining clause which separates it from the next verb *seri*:

a waka her foto seri sani
he walked whole town sold things (= he peddled things throughout the whole town)

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from the verb to the end of the sentence, but in the imperative sentence it always descends slightly at the end of the sentence.

[18] For clarity's sake we have slightly simplified the linguistic facts. In actual fact the following verbs in the chain may also occur in the form with *e*- prefixed, but there this prefix has a special function, as will become clear presently. However, the other prefixes and combinations of prefices cannot accompany a following verb in the chain.

This shows that in Sranan several verbs may occur after one single subject which together express a complex action. Tense, mode and aspect are only shown by the form of the first verb. This construction we call *the verbal chain.*

Not all verbs are susceptible of being arranged in a verbal chain, as their meaning occasionally prevents this. This becomes clear already from the fact that one cannot construct a verbal chain *seri waka* (sell walk). It also proved impossible to combine a verb indicating a certain action with a verb indicating the result of the first action; in this way it is impossible to combine in one chain the verbs *suku* (to seek) and *feni* (to find).

During our research we found two striking linguistic facts:

1. Between the verbal elements of the chain it proved possible to insert the word *fu* (occurring elsewhere as a preposition with the meaning "of," "for"). The subject could even be repeated after *fu* without causing a break in the chain, because it became evident that the verb following *fu* (with or without the repeated subject) even in that case could not occur in the forms with prefixed *ben-* or *sa-*.

m e-tek wan sani fu (mi) tja go n abrasee
I take a thing for I carry go to across (= I take something to bring it to the other side)

We even find the word *fu* (which often agrees with "in order to") in places where one would not expect it, because we do not feel any final subordonnation between the verbs:

i mus fu kon drape
you must (for) come there (= you absolutely must go there)

The function of the word *fu* is as yet incompletely known.19)

2. Furthermore it is noteworthy (cf. also note 18) that following verbs may occur in the verbal chain prefixed by *e-*, but not in the other verbal forms. In order to illustrate this we will analyse an example from our material:

mi opo wan ptjin sani f mi srefi e-mek wantu sani
I opened a small business for my self made some things

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19) Investigation showed that here the linguistic fact is quite complicated. When *fu* is followed by the verb *kan* (to be able to), the subject has to be repeated. In that case the verbal chain has been broken, because under those circumstances the verb *kan* may occur in all verbal forms. We hope to be able to return to this problem at a later occasion.

e-waka seri
walked sold (= peddled).

The subject *mi* is not only the subject of *opo*, but also of *meki*, *waka* and *seri;* together these four verbs make up a verbal chain. Within this chain nouns occur as objects to *opo* and *meki*. The two verbs occurring in the middle are characterised by the verbal prefix *e-*. Have we to assume that every verb in the chain possesses its own verbal aspect? However, the verbs *waka* and *seri* cannot belong to different aspects. There are numerous examples which show that the verbal form of the first verb of the chain determines tense, mode and aspect of the whole chain. Then the question arises what could be the function of the prefix *e-* for the following verbs in the chain; would it have a function there which differs from that when serving as a prefix to the first verb where it indicates the non-completive aspect of the chain?

During the experiments we had our informants perform with this sample-sentence, we were surprised to see that the following sentence was rejected:

*(*mi opo wan ptjin sani e-mek wantu sani*)
I opened a small business made some things

The sentence was only approved when *e-waka seri* had been added; this addition therefore seemed necessary. However, the following sentence proved acceptable:

mi opo wan ptjin sani e-mek sturu
I opened a small business made chairs

In the disqualified sentence the word *sani* (thing) was too vague and only the addition of *e-waka seri* made it sufficiently determined as "goods for sale". The word *sturu* by itself was sufficiently determined. Hence, within the verbal chain there has to exist a self evident relation between the parts. This we noted already earlier when we saw that e.g. the verbs *suku* (to seek) and *feni* (to find) could not be combined in a verbal chain, merely because of their meaning. In the present case it becomes apparent that also non-verbal elements pay a role. The verbs *opo* and *meki* can only be combined in one verbal chain if it is clear that a factory is opened where certain articles are made. This led us to the conclusion that the succession of the different components of the action had to be studied.

During this study it became apparent that it was not possible to connect an action in its non-completive aspect (verbal form prefixed by *e*-) with a following action in its completive aspect; the reverse, however, proved possible. When therefore the first verb of the chain occurs in the form prefixed with *e*-, repetition of this prefix becomes superfluous for the following verbs. In that case the following verbs can only occur in their non-completive aspect. However, when the first verb occurs in a form unprefixed by *e*- (like in the example discussed above) it is possible for the prefix *e*- to exercise its normal function as indicator of the non-completive aspect for the following verbs.

We then arranged our material in two groups: one where the verbal chain was opened by a verbal form with the prefix *e*-, and another where this was done by a form without this prefix. Only in the first group the prefix *e*- could continue to fulfill its original function for the following verbs.

a man lib en her kofisak a Aruba e-gw a den uma
the man left his whole coffeebusiness at Aruba goes () the women
baka
behind (*a* ... *baka* = behind, after).

The first component of the action is completive, whilst it is left undecided whether the subject is perhaps still running after women. If the prefix *e*- is omitted, the last action is likewise completed. It is difficult for us to indicate the difference in our language.

den man tjibri footoo so e-tak : i sji d
the men hid photographs so as-if-always-saying: you see the
uma disi !
women these!

As is to be observed, the verbal form prefixed with *e*- may also in this case often be translated by a durative or an iterative 20).

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20) In order to keep the argument clear, we give only a few examples. The following example, however, is too curious – also for other reasons – not to mention it. For here we observe a verbal determination of locality and a verb combined in one chain. The free translation of this sentence elucidates the function of the prefix.

dan en nanga Peroti ben-dap e·-wroko
then he with Peroti were-there worked (then he and Peroti were working there)

The lengthening of *e·* shows that here the end of the word *dape* (to be-there) has coalesced with the prefix *e*- before *wroko*.

In the second group the prefix *e-* could not exercise its original function. The whole verbal chain is in the non-completive aspect and repetition of the prefix *e-* for the following verbs seems therefore unnecessary, but to our informants repetition of the prefix seemed more jolly, more "juicy".

m b-e-du muiti e-ler a tongo ptjinso
I did trouble learned the language a-little-bit

The prefix *e-* before the second verbal form could be left out without resulting in a clear-cut difference in meaning. Such a difference was observed in the following example:

a ptjin e-tek skropu e-tja go n abrasee
the child is-busy-taking sea-shells carrying go to across
(the child is busy carrying a pile of sea-shells to the other side, going back and forth).

In this sentence the informants see the child continuously engaged in carrying a heap of sea-shells to the other side, pail by pail. However, with the second verb in the unprefixed form, the situation becomes completely changed. For in that case one single action is described: a pile of sea-shells is carried across in one movement.

This led us to the solution of the problem. Without the prefix *e-* before the following verbs we are dealing with a combined action *tek tja go* (= to carry to), i.e. with an unit of action. The prefix before *tja go* divides this unit into two parts: *tek* (to take, to get) + *tja go* (to carry towards). It is also possible to represent these parts alternatingly, like in the preceding example.

Now we also have come to a better understanding of the function of the prefix *e-* in the first group, where the components of the action are considered in different aspects. Also there the unit of action has been broken up. The same occurs in the second group, but because in the latter case both components of the action occur in the same aspect it becomes possible that no clear difference in meaning is observed between the split and the unsplit unit of action.

Apart form its original function of indicating the non-completive aspect, the prefix *e-* for the following verbs in the verbal chain has the special function of indicating the unit of action. The first function is primary; however, in case the prefix *e-* exercises its primary function within a verbal chain, it causes a split in the unit of action.

This term "unit of action" introduces a new element. Unit of action goes beyond the verbal chain, because it also includes nominal and pronominal elements. At the same time it is less than the verbal chain, as the latter is not disrupted by the introduction of a prefix *e-* in its following links. But this does lead to a break in the unit of action. Hence, a verbal chain may include several units of action. The complexity of the construction of such a unit of action is demonstrated by the following example:

den man de f or i grab i fut or a
the men are-on-the-lookout to hold you grab your foot hold on
gron
ground

§ 5. THE AUXILIARY VERBS

It has by now become apparent that verbs in Sranan may all occur accompanied by the verbal prefixes enumerated in § 2. Within the verbal chain they appeared to be restricted in so far that only the first verb of the chain could be accompanied by all prefixes and their combinations. The following verbs could only occur in the form prefixed by *e-*. But even this is not always possible, it appears.

m e-go fter u wan tori
I go tell you a story
a e-waka go na oso
he walk go to house

The verb *fteri* in the first example and *go* in the second may only occur in this position in the verbal chain in the unprefixed form. This does not result from the special nature of the verbs *fteri* and *go*, but from the nature of the relation between the verbal couples *go fteri* and *waka go*; the unit of action in these verbal chains cannot be split up. Substitution of the different verbs shows which are the verbs responsible for this fixed relation, as becomes apparent from the following examples:

mj om e-fter u wan tori
I must tell-all-the-time you a story
a e-waka e-pree
he walks playing

These examples show that the word *go* was responsible for the fixed connection with on the one hand the following verb *fteri*, and on the other with the preceding verb *waka*. *Fteri* and *waka* are capable of forming the verbal nucleus of a unit of action also in a verbal chain, but the word *go* cannot.

In the first example the word *go* is quite clearly a verb; it can occur in the different verbal forms, i.e. accompanied by all verbal prefixes. Here we have found a verb which in the verbal chain behaves differently from the other verbs. This is not only true for *go*, but for a number of verbs which will be treated later. These are all verbs, because they show all the characteristics of verbs; it is only that in a verbal chain they cannot be separated from the following verbs by means of the prefix *e-*.[21] This means to say that they cannot constitute the verbal nucleus of an unit of action in a verbal chain. We shall call these verbs auxiliary verbs here; they form a sub-category within the category of the verbs. Each of these verbs is accompanied by a homonym which completely falls within the class of independent verbs. The form *go* may quite well constitute the nucleus of an unit of action, but only when it is used independently outside the verbal chain:

m	*e-go*	*na*	*oso*
I	go	to	house

In that case, however, we are dealing with another word, as often becomes apparent in the difference in meaning between the verb and the auxiliary verb.

In the second example of this paragraph there occurs a word *go* of which the verbal character in this position in the verbal chain will never be proved by direct means. In this position in the chain the word *go* can never be accompanied by a verbal prefix; this is not only true for *go*, but for a number of words to be discussed below. The verbal character of these forms cannot be proved by means of the occurrence of independent verbal homonyms, as little as the existence of an auxiliary verb of the same form can tell us something about the nature of the former. Still, there exists a clear correspondence between this still ummentioned category and the category of the auxiliary verbs. This category likewise seems to be closely connected with an accompanying verb (in this case preceding and not following it) and for that reason it cannot be separated from it by means of the prefix *e-*. As, however, it is closely connected with the preceding verb, it can never occur in combination with the prefix *e-*. Should it therefore be impossible for it to be a verb? We have never been able to ascertain that a non-verbal element formed part of the verbal chain. In case this unknown element were an auxiliary verb, it could not have behaved differently in this position in the verbal chain. The interplay of two factors (the normal characteristics of the auxiliary verb and the place behind the accompanying verb) here leads to a situation where the formal characteristics of the auxiliary verb exclude the appearance of the formal characteristics of the verb. We believe therefore that we are entitled to include this group of words within the auxiliary verbs.

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[21] It is equally impossible that they could be separated from it by the word *fu*. Wherever *e-* cannot occur in the verbal chain, *fu* cannot occur either. We still know too little about this word to be able to use it as a distinguishing characteristic.

An auxiliary verb can never occur independently, it must always occur closely connected with a following or a preceding verb in a verbal series. Hence it is very simple to recognise the auxiliary verbs in Sranan. The impossibility for verbs to occur combined with the prefix *e-* in the verbal series enables us to recognise the closely connected verb-couples. Substitution of the elements of such a close couple leads us to recognise those verbs which are responsible for the close union. These are the auxiliary verbs. By investigating our material along these lines we found the following auxiliary verbs:

A. Placed *before* the accompanying verb [22])

1. *go* (to go) as the indication of a future action

da u b-e-lob go luku a watrasee
then we loved go look at water-side

2. *kon* (to come)

i no m kon fu kon sjwen dape
you not must come for come swim there

As an independent verb *kon* means "to come" or "to start to." The first meaning is generally known. For the second meaning some examples follow here.[23])

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[22]) The fixed relation is symbolised in the examples by connecting the elements of the fixed couple.

[23]) We were unable to determine the true nature of another occurrence of the verb *kon*. Here we give an illustration of its use:
drai ko u jere!
turn let us hear! (said of a gramophone record).

a e-kon e-tjis djesi
it starts to get yeast (= it is starting to ferment)
a e-kon e-gi bigi mofo
he starts to-give big mouth

3. *wani* (to want to)

dat wan tak: m e-go lon se
that want say: I go run sea (= sailing)

4. *du* (as an independent verb meaning "to do") is used to intensify the following verb.

ma j n e-sab f a mon e-du kon
but you not know how the money actually comes

5. *seni* (as an independent verb meaning "to send") indicates the circumstance that the subject has the action performed by someone else.

m e-sen kar wan datra
I send call a doctor (I am having the doctor called)

6. Undoubtedly there exist more auxiliary verbs that are placed before the accompanying verb. We are doubtful about *teki* (to take) + object as an indication of the instrument by means of which the action is carried out. Our informants did not use this construction personally and the behaviour of this verb was therefore difficult to investigate via these persons. Still, we give an example from the older poetry:
mi teki 24) *Gado begi ju*
I take God beg you (I beg you by God)

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24) The use of *teki* in the unprefixed form is also remarkable in this case. Formerly old texts had already given us the impression that anciently the verbal system must have been different from the present one. The line occurs in a poem of approximatively 1840. On p. 108 of the grammar quoted in note 7 Father Donicie gives some more examples of this use of the word *teki*. We are still uncertain about the verb *meki* (meaning "to make" when used independently):
taig en mek a gwe!
tell him make he go-away! (tell him that he has to go away).
m e-go drai san mek i jere
I go turn something make you hear (= I am going to play a record in order to let you hear it).

B. Placed *after* the accompanying verb

1. *go* (meaning approximately: away from)

da mi har mi bruku go t a m kindi
then I hauled my trousers away up to my knees (= then I rolled my trousers up to my knees)

da mj o sen i g a pomposo needji
then I go send you away to pump-house nine

2. *kon* (meaning approximately: towards)

d a man dat kar i kon
then the man that call you this-way (the man that = that man)

3. *saka kon* (as independent verbs meaning to fall + to come) meaning downwards.

a e-pur herher a uma f a president fu
he pull wholly the woman (= wife) of the president of
Argentina saka k a gron
Argentina down-wards to ground

4. *kmopo* (from)

den no ben-man tjisi kmop a dorosee
they not could get from at overseas

5. *psa* (past)

dan mi tan psa zevende klas
then I remained past seventh class (= up to and including the 7th form).

In this group the many auxiliary verbs which indicate a direction are necessary because in Sranan prepositions only indicate locality, generally by means of *a* or *na* (= at) or more closely defined *na ini* (= at in), *na tapu* (= at on), *na baka* (= at behind), etc. But they never indicate direction, which can only be indicated by the verbs themselves. Therefore *puru na ini* means "to pull out" and *poti na ini* "to put in." In case the direction is not sufficiently clearly expressed by the action, an auxiliary directional verb is added to the unit of action.

6. *gi*, also occurring in the form *dji* (for, for the sake of)

a man e-pai g i
the man pays for you

7. *taki* (as an independent verb meaning "to say"), as an introduction to statements after *verba sentiendi et declarandi*

m sab tak a tru
I know (that) it is-true

In the same manner *taki* can also be used in order to introduce a subsidiary sentence after a noun, connected with the *verba sentiendi et declarandi* 25):

mi ben-mek mi plan tak m wan gw a Ptatakondra
I had-made my plan (that) I want go to Holland
mi b-e-waka nanga wan prakser tak m wan tron matrosi
I walked with one idea (that) I want become seaman

§ 6. TRANSITIVE AND INTRANSITIVE USE OF THE VERBS

In Sranan the difference in the transitive and intransitive use of the verbs is very important. In case a verbal form can be used transitively as well as intransitively, the intransitively used form indicates the passive and the transitively used form the active.

m bj-om go keur
I had-to go be-examined
datra keur mi
Doctor has-examined me
a n·njan e-prati
the food is-divided
den e-prati a n·njan
they divide the food
a ben-sroto
he was-locked up
den ben-sroto en
they had-locked up him

Also verbs like *siki* (to be-ill), which seem to correspond with our adjectives (see § 2), can often be used transitively:

Leba siki mi
Leba has-made-ill me

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25) It was a problem to us whether we were dealing with a verbal chain or with an ἀπο κοινου -construction. However, the fact that *taki* in this position can never occur in another verbal form indicates clearly a verbal chain, we believe.

a frede mi (*mi frede* = I am frightened)
he has-frightened me
apresina e-heb i f i lon (*den hebi* = they are-heavy)
oranges make-heavy you if you go

Here we should remark, however, that the object may be omitted, when the active meaning is clear from the situation. To conclude with an example taken from Father Donicie,[26] it will only be possible to ask: *Fu-san ju no wasi tide*? (Why you not have-washed to-day?), when the situation excludes the passive meaning (Why did you not wash yourself to-day?). In case the situation is not sufficiently clear, an object – like e.g. *krosi* (clothes) – will have to be added.

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[26] A. Donicie, op. cit., p. 63.

STRESS IN ENGLISH WORDS
(continued)

Summary

This study of *Stress in English Words*, the first half of which appeared in LINGUA, Volume VI, 3, seeks to demonstrate that the categories of English word-stress, which are best determined by reference to the Rhythm Patterns of English words, exhibit a high degree of correlation with vowel quality and that their distributional relationships in words can be stated in terms of a few, relatively simple, general principles. In the first half of this study the general thesis was discussed (Chapters I, II and III) and the data, supporting this thesis, was given in respect of Pre-Tonic Rhythmic Stress Patterns (Chapter IV). In this concluding half the data in respect of Post-Tonic Rhythmic Stress Patterns are set forward (Chapter V), the status of each Rhythmic Stress Pattern is determined (Chapter VI) and the Distributional Relationships of Stress Categories, implicit in the data given in Chapters IV and V, are summarized (Chapter VII).

V. POST-TONIC RHYTHMIC STRESS PATTERNS 54)

Pattern $\overset{1}{\smile}\overset{2}{\circ}$

67. Examples: *reading-room* 55), *ambulance*, *advantages*, *obsolete*, *suicide*, *impersonate*, *balefully*, *accountable*, *apheresis*.

68. Vowel distribution:

Position 1.	FORTIS	(iː)	e	(æ)	(ɑː)	(ɔ)	(ɔː)
		(uː)	ʌ	əː	(ei)	(ai)	(ɔi)
	LENIS	i	ə	u	o		
Position 2.	FORTIS	All					
	LENIS	i	ə	u			

The types of post-tonic vowel sequence which result from this vowel distribution are:-

(a) LENIS plus FORTIS: very common both in COMPOUND, e.g. *curling-*

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54) Abbreviated hereinafter to post r.s.p.

55) See footnote 22 for a comment on the simultaneous treatment of SIMPLE and COMPOUND words in this and all other relevant post r.s.p.

tongs, and SIMPLE words, e.g. *confiscate*; correlation between stress and vowel quality normal in both positions.

(b) LENIS plus LENIS: likewise very common both in COMPOUND, e.g. *rolling-pin*, and SIMPLE words, e.g. *achievable*; for strong LENIS in Position 2 see paras. 70 and 71.

(c) FORTIS plus FORTIS: comparatively rare; occurs alike in COMPOUND, e.g. *cuckoo-clock*, and SIMPLE words, e.g. *emendate*; for weak FORTIS in Position 1 see paras. 73 and 74.

(d) FORTIS plus LENIS: very rare; only found in COMPOUND words, e.g. *statute-book*; correlation between stress and vowel quality abnormal in both positions: see para. 75.

69. In the case of words like *rolling-pin* /i – i/, *reading-book* /i – u/, *Cornishman* /i – ə/, presenting the post-tonic sequence LENIS plus LENIS, the strongly stressed LENIS vowel in Position 2 is explicable by the PRINCIPLE OF COMPOUND WORDS (para. 10b): the NON-TONIC STRONG stress in Position 2 corresponds to the TONIC STRONG stress associated with the isolate words *pin*, *book*, *man*.

70. As for SIMPLE words having the post-tonic sequence LENIS plus LENIS and post r.s.p. ◡o, a study of all post r.s.p. reveals that the final LENIS vowel in any 56) SIMPLE word always has a NON-TONIC STRONG stress when it follows another LENIS vowel; thus *Exeter* /i – ə/ has post r.s.p. ◡o, *hygienically* /i – ə – i/ has ◡◡o, *charitableness* 57) /i – ə – ə – i/ has ◡◡◡o, *notifiable* /i – ai – ə – ə/ has ◡o◡o. Furthermore if we analyse all SIMPLE words in which the post-tonic sequence is exclusively LENIS we find that in all such words 56), with the exception of *baronetages* and *qualificative*, that is four-syllabled post-tonic sequence with LENIS /i/ in Position 2 (para. 113), the invariable practice is for all the non-final LENIS vowels to be rhythmically weak and thus to have WEAK stress. Hence if we exclude *baronetages* and and *qualificative* all SIMPLE words 56) presenting only LENIS vowels post-tonically must belong to post r.s.p. ◡o, ◡◡o or ◡◡◡o depending on the number of syllables in their post-tonic sequence. Though some

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56) Words ending in *-ism* /izəm/ and English placenames with the terminations *-minster* /minstə/, *-borough* (*-burgh*, *-boro'*) /bərə/ and *-bury* /bəri/ are exceptional if considered as SIMPLE words. See paras. 80–82 for a detailed analysis of such cases.

57) See paras. 117–119 for an alternative treatment of *-ness* words as COMPOUNDS.

COMPOUND words such as *rolling-pin* /i – i/ post r.s.p. ⌣o and *cookery-book* /ə – i – u/ post r.s.p. ⌣⌣o also exhibit exclusively LENIS post-tonic sequences with only the final LENIS vowel strongly stressed, we feel that a more compact statement results if, as in the case of *rolling-pin* in para. 69, we determine the placement of the NON-TONIC STRONG stress by the PRINCIPLE OF COMPOUND WORDS, since many other COMPOUND words, *gas-fitter* /i – ə/ post r.s.p. o⌣ and *Englishwomen* /i – i – i/ post r.s.p. ⌣o⌣ for instance, have the same all LENIS post-tonic sequence but yet do not show a NON-TONIC STRONG stress finally; for such words the application of the PRINCIPLE OF COMPOUND WORDS is essential. Furthermore, as we shall see (para. 129), treating COMPOUND words such as *rolling-pin* and *cookery-book* separately from SIMPLE words like *advantages* and *hygienically* brings us a decided advantage in our statement of basic post r.s.p.: for SIMPLE words ⌣o and ⌣⌣o are basic, for *rolling-pin* and *cookery-book* these post r.s.p. are best considered as composite patterns.

71. Before considering the two remaining sequences (c) and (d) given in para. 68, we must point out a further stress characteristic of a final LENIS vowel. In SIMPLE words a final LENIS vowel always has a WEAK stress when it follows a FORTIS vowel occurring in the penultimate syllable. Thus, for example, LENIS /i/ in the plural termination /iz/ which, following from what we have said in para. 70, has a quite regular NON-TONIC STRONG stress in *advantages*, is weakly stressed and therefore affords a normal correlation between stress and vowel quality in *processes* /e – i/, *converses* /əː – i/ and the like, all with post r.s.p. o⌣. Now in the course of our researches we have discovered no post r.s.p. which presents a sequence of two WEAK stresses finally [58]; this fact, together with the varying stress behaviour of a final LENIS in all post-tonic sequences, allows us to draw the following conclusions:-

(i) In SIMPLE words the correlation of NON-TONIC STRONG stress with a final LENIS vowel following another LENIS vowel must be regarded as a normal correlation in that it prevents the final sequence of two WEAK stresses that would otherwise arise. As soon as the final LENIS of any post-tonic sequence in SIMPLE words is preceded by a FORTIS vowel (equals NON-TONIC STRONG stress), as in *equinoxes* for instance, it has its more regular correlation with WEAK stress.

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[58] Though we have so far been discussing only SIMPLE words, reference to words such as *wind-instrument* /i – u – ə/ post r.s.p. o⌣o and *dancing-mistresses* /i – i – i – i/ post r.s.p. ⌣o⌣o shows that COMPOUND words likewise do not permit two WEAK stresses finally in the post-tonic sequence, and that this principle is thus general for all words. Post r.s.p. and p.r.s.p. (which never have two WEAK stresses *initially*: compare para. 20) thus show a striking symmetry in this respect.

(ii) A sequence of two NON-TONIC STRONG stresses finally in the post r.s.p. of SIMPLE words is also an impossibility, a conclusion amply confirmed by our investigations which have revealed no such post r.s.p.: as soon as LENIS /i/ in the plural termination /iz/, which takes a NON-TONIC STRONG stress in *advantages*, is preceded by a FORTIS vowel (equals NON-TONIC STRONG stress), as in *processes*, it reverts to its more usual correlation with WEAK stress.

(iii) In SIMPLE words with monosyllabic post-tonic sequences the correlation in Position 1 between stress and vowel quality is normal, NON-TONIC STRONG with FORTIS, WEAK with LENIS. The NON-TONIC STRONG stress on the final syllable of *advantages* indicates that LENIS /i/ finally in *advantage* has a WEAK stress whereas the WEAK stress on the last syllable of *processes* clearly shows that *process* has a NON-TONIC STRONG stress on FORTIS /e/ in its final syllable: when /iz/ is added to *advantage* and *process* the resulting dissyllabic post-tonic sequence in neither case presents a combination of like stresses.

72. As a result of this last conclusion (para. 71 iii), we now set up (a) basic post r.s.p. ⌣, appropriate for all SIMPLE words having a monosyllabic LENIS post-tonic sequence, such as *reading* and *better* and (b) basic post r.s.p. o, used for all SIMPLE words with a monosyllabic FORTIS post-tonic sequence, for example *impulse, convex*. We may note here that this basic post r.s.p. is also appropriate for those COMPOUND words in which the second word element is monosyllabic and constitutes the whole of the post-tonic sequence. The vowel in this monosyllabic post-tonic sequence may be FORTIS as in *bookcase* or LENIS as in *bullfinch*: the NON-TONIC STRONG stress on the final syllable of these two words is attested by the use of basic post r.s.p. o⌣ for their plurals *bookcases* and *bullfinches*. The correlation of NON-TONIC STRONG stress with LENIS /i/ in *bullfinch* shows that the PRINCIPLE OF COMPOUND WORDS (para. 10b) can be extended to cover all

post-tonic sequences, monosyllabic and polysyllabic alike. Thus *chalk-pit*, for example, takes basic post r.s.p. o, LENIS /i/ in this word being strong by the PRINCIPLE OF COMPOUND WORDS. For *bookcase* of course the PRINCIPLE OF COMPOUND WORDS as above extended, does not have to be invoked, since the vowel quality/stress correlation is normal.

73. We must now consider the third of the four types of post-tonic sequence having post r.s.p. ⌣o, namely FORTIS plus FORTIS (para. 68c). EPD affords 39 examples, nine of which are COMPOUND words:-

Talesman /iː – æ/, *congressman* /e – æ/, *process-blocks* /e – ɔ/,
no-man's-land /æ – æ/, *Brecknockshire* /ɔ – iə/,
Renfrewshire /uː – iə/, *cuckoo-clock* /uː – ɔ/,
relay-race /ei – ei/, *transmigrate* /ai – ei/.

In all these words Position 2 is shown both by vowel quality and by the PRINCIPLE OF COMPOUND WORDS to bear a NON-TONIC STRONG stress. Furthermore in all but *no-man's-land* Position 1 is marked as strongly stressed not only by vowel quality but also by our findings in para. 72: all the above examples, again excepting *no-man's-land*, are COMPOUND words of the type dissyllable plus monosyllable, and the dissyllable with the FORTIS in Position 1 constituting the whole of its post-tonic sequence, should have post r.s.p. o: this conclusion is supported by the comparison of *congress*, *process* and *relay* with *congresses* /e – i/, *processes* /e – i/ and *relaying* /ei – i/, the three latter words corresponding quite regularly to post r.s.p. o⌣. Similarly Position 1 in *no-man's-land* can, by consideration of its vowel quality and by a simple extension of the PRINCIPLE OF COMPOUND WORDS to include COMPOUNDS of more than two word elements, be marked with a NON-TONIC STRONG stress. And yet in spite of all this evidence the fact is that all the above nine words are always said with a WEAK stress in Position 1 and a NON-TONIC STRONG stress in Position 2. Consideration of all post r.s.p. however makes it clear that in any COMPOUND word the NON-TONIC STRONG stress occurring on the final syllable of the first element when said in isolation is always replaced by a WEAK stress when the initial syllable of the following element of the COMPOUND takes a NON-TONIC STRONG stress. Thus compounding *congress*, post r.s.p. o, with *man*, post r.s.p. o, quite regularly gives post r.s.p. ⌣o for *congressman*. Compare also in this respect *telephone*, post r.s.p. ⌣o, plus *bell*, post r.s.p. o, giving post r.s.p. ⌣⌣o for *telephone-*

bell, and *epoch*, post r.s.p. o, plus *making*, post r.s.p. o◡, giving post r.s.p. ◡o◡ for *epoch-making*. On the other hand contrast the retention of the NON-TONIC STRONG stress on the final syllable of *telephone* in *telephone-account* since this NON-TONIC STRONG stress is now followed by a WEAK stress on the initial syllable of the second element of the COMPOUND word. The use in the above nine words of a WEAK stress in Position 1 where a NON-TONIC STRONG stress might on all accounts be expected is yet another example of the tendency, noted many times in pre-tonic r.s.p., for a sequence of two NON-TONIC STRONG stresses to be avoided whenever possible, especially if the r.s.p. which then arise are common.

74. The remaining 30 SIMPLE words said with post r.s.p. ◡o and presenting the sequence FORTIS plus FORTIS are:
concretize /iː – ai/, *emendate* /e – ei/, *prefecture* /e – uə/,
impregnate /e – ei/, *flagellate* /e – ei/, *Parnellite* /e – ai/,
compensate /e – ei/, *concentrate* /e – ei/, *demarcate* /ɑː – ei/,
incarnate /ɑː – ei/, *exarchate* /ɑː – ei/, *elongate* /ɔ – ei/.
diphthongize /ɔ – ai/, *Ickornshaw* /ɔː – ɔː/,
exorcize /ɔː – ai/, *fecundate* /ʌ – ei/, *inculpate* /ʌ – ei/,
inundate /ʌ – ei/, *exculpate* /ʌ – ei/, *adumbrate* /ʌ – ei/,
obfuscate /ʌ – ei/, *consummate* /ʌ – ei/, *innervate* /əː – ei/,
incurvate /əː – ei/, *expurgate* /əː – ei/, *extirpate* /əː – ei/,
objurgate /əː – ei/, *bifurcate* /əː – ei/, *Hebraize* /ei – ai/,
Samoyed /ɔi – e/.

In many of the words the FORTIS vowel in Position 1, especially if /e/, /ʌ/, or /əː/, is frequently replaced by a LENIS vowel, usually /ə/ though /i/ is also found for /e/; the resulting vowel sequences, of the type LENIS plus FORTIS, correlate quite normally with post r.s.p. ◡o. However this reduction of the Position 1 FORTIS vowel is not possible for all the above words and we must therefore seek some more comprehensive explanation of the apparently irregular correlation FORTIS vowel/WEAK stress in Position 1. A detailed analysis of the stressing of two successive FORTIS vowels in SIMPLE and COMPOUND words is given in para. 107; suffice it here to say that one of the important conclusions to be drawn from that analysis is that in SIMPLE words the sequence FORTIS plus FORTIS always represents a WEAK stress followed by a NON-TONIC STRONG stress: the first of the two FORTIS vowels never corresponds to a NON-TONIC STRONG stress. Again we note the avoidance of two successive strong stresses within the post-tonic sequence 59). It is also noteworthy that the only words to have this same sequence of FORTIS plus FORTIS said with post r.s.p. o⌣ are all COMPOUND and very limited in number (para. 78).

75. Of the remaining sequence given in para. 68, FORTIS plus LENIS, we have found only nine examples in EPD, all COMPOUND words; they are:-

wineglassful /ɑ: – u/, *teaspoonful* /u: – u/, *teacupful* /ʌ – u/,
statute-book /u: – u/ 60), *cuckoo-pint* /u: – i/ 60),
cuckoo-spit /u: – i/ 60), *railwayman* /ei – ə/ 61),
highwayman /ei – ə/ 61), *viceroyship* /ɔi – i/.

For all these words the PRINCIPLE OF COMPOUND WORDS indicates a NON-TONIC STRONG stress on the LENIS vowel in Position 2. With this position established as strongly stressed the above words are then in all respects comparable with the COMPOUNDS discussed in para. 73. *Wineglassful*, *teaspoonful* and *teacupful* behave like *no-man's-land*: the NON-TONIC STRONG stress, suggested for Position 1 in these words by vowel quality as well as by the PRINCIPLE OF COMPOUND WORDS (para. 73) 62), is replaced by a WEAK stress before the NON-TONIC STRONG stress occurring in Position 2. The remaining words are to be compared with, for example, *congressman* and *relay-race*: the NON-TONIC STRONG stress, appropriate for the monosyllabic FORTIS post-tonic sequence of *statute* and *railway* (paras. 71iii and 72), is

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59) It will be recalled that in pre-tonic sequences such a succession of two NON-TONIC STRONG stresses is only possible when the first equals a separable monosyllabic prefix and even then some attempt is made to eliminate one of the two strong stresses: compare for example para. 26.

60) FORTIS /u:/ in this word is now often replaced by LENIS /u/ giving a LENIS plus LENIS sequence.

61) LENIS /i/ for FORTIS /ei/ is now common in this word and an all-LENIS post-tonic sequence results. Other pronunciations have a monophthongal vowel of an /e/ type, but different from /e/. A good case could be made for extending the LENIS category to include this vowel, this LENIS /e/ bearing the same relation to FORTIS /ei/ as LENIS /o/ does to FORTIS /ou/. Note also the symmetry then exhibited by /i/ and this LENIS /e/ on the one hand and /u/ and /o/ on the other.

62) That the FORTIS vowel in Position 1 is potentially strongly stressed is obvious if for example we replace the termination *-ful* of *wineglassful* by the plural *-es* /iz/: *wineglasses* post r.s.p. o⌣ has a quite regular vowel quality/stress correlation. For a discussion of the status of *-ful* see para. 102.

replaced by a WEAK stress before the NON-TONIC STRONG stress on Position 2 in *statute-book* and *railwayman.*

1 2
Pattern o⌣

76. Examples: *greengages, Westminster, crab-apple, converses, bookcases, Newmarket, cubism, tricoloured, ear-marking.*

77. Vowel distribution:

Position 1.	FORTIS	All though /ɔi/, /iə/, /ɛə/ and /uə/ are rare.
	LENIS	i u
Position 2.	FORTIS	(u:) (ou)
	LENIS	i ə

The types of post-tonic vowel sequence to which this distribution gives rise and of which we have found examples are:-

(a) FORTIS plus LENIS: very common in COMPOUND words, e.g. *mouthpieces*, but much less common in SIMPLE words, e.g. *converses*; stress/vowel quality correlation normal in both positions.

(b) FORTIS plus FORTIS: very rare and in COMPOUND words only, e.g. *grand-nephew*; for the weak FORTIS in Position 2 see para. 78.

(c) LENIS plus LENIS: very common but only in COMPOUND words, e.g. *greenfinches*, in words ending in *-ism*, e.g. *defeatism* and in English place-names ending in /minstə/, /bərə/, and /bəri/; for strong LENIS in Position 1 see paras. 79–82.

78. The number of examples with a FORTIS plus FORTIS post-tonic sequence is very limited and so far as EPD is concerned they are all COMPOUND words with *fellow, barrow* and *nephew* added to monosyllabic words which, in the COMPOUNDS, bear the TONIC STRONG stress: thus *play-fellow, wheel-barrow, grand-nephew.* In all the examples the NON-TONIC STRONG stress on the FORTIS vowel in Position 1 is established by the PRINCIPLE OF COMPOUND WORDS and the WEAK stress occurring on the FORTIS vowel in Position 2 suggests the possibility of extending to COMPOUND words the general principle valid for SIMPLE words (para. 72ii), namely that a sequence of two NON-TONIC STRONG stresses is not permitted finally in post r.s.p. At the same time we should note that, in the speech of many, the post-tonic vowel sequence is 'regularized' by the replacement of FORTIS /ou/ and /u:/

by LENIS /o/ and /u/ respectively. This 'regularization' of the post-tonic vowel sequence takes on added significance when we consider that a general statement to the effect that a post-tonic sequence FORTIS plus FORTIS always represents post r.s.p. ◡o is only prevented by the handful of words of the *play-fellow* type. The implications arising from the correlation of WEAK stress with FORTIS vowel in Position 2 of these words are fully discussed in para. 93.

79. The majority of words presenting LENIS plus LENIS as their post-tonic sequence and said with post r.s.p. o◡ cause no difficulty. They are COMPOUND words in which Position 1 is marked with a NON-TONIC STRONG stress by the PRINCIPLE OF COMPOUND WORDS; hence LENIS /o/ and /ə/ are not given in para. 77 above [63]. Sequences with /i/ in Position 1 are much more frequent than those having /u/ in that position: EPD gives 56 words with /i – i/, *prefixes* [64], *speed-limit, greenfinches* for instance, 36 with /i – ə/ [65], such as *bell-ringer, half-sister, outfitter*, 5 with /u – i/, for example *rose-bushes, odd-looking*, and 13 with /u – ə/, mostly COMPOUNDS ending in *-woman* like *kinswoman, horsewoman*. In view of the structure of these words it seems likely that many more examples, especially of the sequences /i – i/ and /i – ə/, could be found. The NON-TONIC STRONG stress in Position 1 of words like *greenˈfinches* and *outfitter* provides good evidence to support our general contention (para. 72) that post r.s.p. o is appropriate for COMPOUND words both elements of which are monosyllabic and the second element of which shows a LENIS vowel: *greenfinches* and *outfitter* with post r.s.p. o◡ indicate *greenfinch* and *outfit* with post r.s.p. o. We must now consider in detail the stressing of words ending in *-ism* and of English place-names in /minstə/, /bərə/ and /bəri/.

80. The termination *-ism* /izəm/ [66] is always pronounced with a

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[63] It will be remembered that we have treated all occurrences of rhythmically strong /o/ as /ou/: compare para. 13. See also paras. 82 and 83 for the possible occurrence of LENIS /ə/ in this position.

[64] Compare footnote 18 for our definition of a COMPOUND word. Words such as *prefixes* in which the first and TONIC STRONG stress-bearing element of the COMPOUND is a prefix are quite rare.

[65] Not included here are the numerous words ending in *-ism* and English place-names with the termination *-minster*. See paras. 80 and 81.

[66] If the monosyllabic pronunciation /izm/ were taken the detail of our argument would naturally be somewhat changed but our general conclusion concerning the status of the termination would remain unaltered.

NON-TONIC STRONG stress on the penultimate /i/ and a WEAK stress on the final /ə/: thus *defeatism, snobbism, realism* and the like have post r.s.p. o⌣. This stressing of /izəm/ remains no matter what the length of the post-tonic sequence in which this termination participates. Hence *syllogism* /ə – i – ə/ has post r.s.p. ⌣o⌣, *secularism* /u – ə – i – ə/ has post r.s.p. ⌣⌣o⌣, *spiritualism* /i – u – ə – i – ə/ [67] has post r.s.p. ⌣⌣⌣o⌣. Most *-ism* words present a post-tonic sequence that is entirely LENIS; but EPD gives a few cases in which a FORTIS vowel immediately precedes this termination. Thus *Forsyte-ism* has /ai/ in Position 1 and post r.s.p. ⌣o⌣, *nicotinism* and *monotheism* have /iː/ in Position 2 and post r.s.p. ⌣⌣o⌣, *malapropism* has /ɔ/ in Position 2 and post r.s.p. ⌣⌣o⌣ and *absolutism* and *opportunism* have /uː/ in Position 2 and post r.s.p. ⌣⌣o⌣. Now it is easy to see that the removal of the termination *-ism* from these words, and from many others such as *secularism* and *spiritualism* in which *-ism* is immediately preceded by a LENIS vowel, leaves words that are still complete and which have a post r.s.p. ending with a NON-TONIC STRONG stress: thus *Forsyte* post r.s.p. o (cf. para. 72), *nicotine, malaprop, absolute, opportune,* as well as *secular,* post r.s.p. ⌣o; similarly *spiritual* [67] has post r.s.p. ⌣⌣o. It is clear then that the addition to such words of the termination *-ism* with its NON-TONIC STRONG stress on the initial /i/ causes the replacement of the final NON-TONIC STRONG stress in *nicotine* and so forth by a WEAK stress. The conclusion is therefore that *-ism* words behave exactly like COMPOUNDS (para. 73) and must be considered as such, *-ism* constituting the second element of the COMPOUNDS.

81. The stressing of English place-names ending in *-minster* /i – ə/ varies. Many speakers, including the author, treat words with this termination in the same way as the *-ism* words just discussed. Thus *Beaminster, Ilminster, Whitminster, Westminster, Axminster, Warminster, Upminster* all have post r.s.p. o⌣. For such speakers these are undoubtedly COMPOUND words in which Position 1 /i/ is clearly marked with a NON-TONIC STRONG stress. Other speakers however pronounce the above place-names with post r.s.p. ⌣o, a stressing which is normal if these names are considered as SIMPLE words (para. 71(i)). The same difference of treatment is apparent in longer place-

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[67] EPD /uə/ taken as dissyllabic: see para. 15. See also para. 124 for further consideration of the word *spiritualism*.

names: thus *Kidderminster* for example occurs variously with post r.s.p. ⌣o⌣ and ⌣⌣o, the former comparable with post r.s.p. o⌣ and the latter with post r.s.p. ⌣o in *Beaminster* etc. Our impression is that post r.s.p. ⌣o is more common for the shorter place-names than is ⌣⌣o for *Kidderminster*.

82. The stressing of English place-names ending in /bərə/ 68) likewise varies. For *Hillsboro'*, *Mexburgh* and *Loughborough*, for instance, post r.s.p. o⌣ is used by speakers who look upon them as COMPOUND words, post r.s.p. ⌣o by speakers for whom they are SIMPLE words. Similarly in longer place-names such as *Peterborough* and *Edinburgh*, both with /ə – ə – ə/, post r.s.p. ⌣o⌣ and ⌣⌣o are possible. All such place-names readily allow pronunciations in which the non-final /ə/ of /bərə/ is elided. When this elision is made, the termination /brə/ always has a NON-TONIC STRONG stress except in the case of those place-names, such as *Hillsboro'*, *Mexburgh* and *Loughborough*, the post-tonic sequences of which becomes monosyllabic as a result of the elision of /ə/. For such place-names post r.s.p. o and post r.s.p. ⌣ are both possible: the former is used by speakers for whom *Hillsboro'* and the like are COMPOUND words, the latter by those who regard these place-names as SIMPLE words.

Identical considerations apply to place-names ending in /bəri/ 69). *Queensbury*, *Halsbury*, and *Dewsbury* are heard both with post r.s.p. o⌣ and post r.s.p. ⌣o; *Overbury* and *Pendlebury* with post r.s.p. ⌣o⌣ and ⌣⌣o. When /ə/ is elided, as it frequently is, the form /bri/ always takes a NON-TONIC STRONG stress except when the post-tonic sequence becomes monosyllabic as a result of the elision: in such cases (e.g. *Dewsbury*) post r.s.p. o and post r.s.p. ⌣ are both possible.

83. As LENIS /ə/ occurring with a NON-TONIC STRONG stress in Position 1 of post r.s.p. o⌣ is strictly limited to one of the several pronunciations possible for place-names ending in *-borough* and *-bury*, this vowel has not been included for that position in the above vowel distribution (para. 77). For the same reason /ə/ is not given in para. 90 as appropriate for the strong Position 2 of post r.s.p. ⌣o⌣.

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68) When the termination *-borough* is pronounced /bʌrə/ its stressing is always NON-TONIC STRONG followed by WEAK and thus correlates normally with vowel quality.

69) The pronunciation /beri/ always has a sequence of NON-TONIC STRONG stress and WEAK stress; the stress/vowel quality correlation is therefore normal.

84. For the other type of post-tonic sequence which can theoretically arise from the vowel distribution given in para. 77, namely LENIS plus FORTIS, no examples have been found. None the less it is conceivable that words such as *pillow* and *billow*, both /i – ou/, might be compounded in a way such that they form a post-tonic sequence corresponding to post r.s.p. o◡. If any such COMPOUND words were found, their stressing could be explained according to the principles given in para. 78 for COMPOUND words with a FORTIS plus FORTIS post-tonic sequence. See also para. 93.

1 2 3
Pattern o◡o

85. Examples: *tea-services, wind-instrument, sandpapering, blast-furnaces, pork-butchery, war-weariness, blood-poisoning, blameworthiness, viscountesses.*

86. Vowel distribution:

Position 1.	FORTIS	e	æ	ɔ	(ɔː)	əː	ei	ai	(au)	(ɔi)	(iə)
	LENIS	i	(u)								
Position 2.	LENIS	i	ə	(u)	(o)						
Position 3.	LENIS	i	ə								

87. This is one of the less common post r.s.p.; in fact EPD offers only 53 examples though, to judge by their structure, it seems certain that the list is by no means exhaustive. With the exception of *realizable* [70]) all our examples are COMPOUND words comprising

(i) a word with a TONIC STRONG stress on its final syllable; very occasionally, as in *viscountess*, this first element of the COMPOUND word may be a separable monosyllabic prefix (see footnote 18); in most of our examples, the first element is a monosyllabic word, but dissyllabic words are also possible, as in *dessert-services* for instance.

(ii) a trisyllabic word which, in isolation, has a TONIC STRONG stress initially and post r.s.p. ◡o, and which, in the COMPOUNDS we are discussing, constitutes the whole of the post-tonic sequence.

Thus Position 1 in all our examples, whether occupied by a FORTIS or a LENIS vowel, can be shown, by the PRINCIPLE OF COMPOUND WORDS, to have a NON-TONIC STRONG stress. 12 of the EPD examples offer LENIS /i/ in Position 1: besides *wind-instrument*, we have also noted *midwifery*, *quick-silvering*, *task-mistresses*, *cod-fishery*, *school-mistresses*, *blood-guiltiness*, *pearl-fishery*, *whale-fishery*, *games-mistresses*, *post-mistresses*, *housewifery*; many more acceptable examples could no doubt be found. The only example we have found with LENIS /u/ in Position 1 is *pork-butchery* (not in EPD) and it seems likely that the number of other examples will prove to be extremely small.

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[70]) Undoubtedly for many speakers EPD /iə/ in this word is dissyllabic; the resulting post-tonic sequence /ə – ai – ə–ə/ having post r.s.p. ◡o◡o shows a normal stress/vowel quality correlation with LENIS /ə/ in Position 4 strong after the weak LENIS in Position 3: compare para. 71(i).

88. The NON-TONIC STRONG stress on LENIS vowels in Position 3 affords us part of the evidence for our statement (para. 71(i)) that the correlation in SIMPLE words of NON-TONIC STRONG stress with a final LENIS vowel following another LENIS vowel must be regarded as a normal correlation. Though in post r.s.p. o⌣o we are dealing with COMPOUND words exclusively, the whole of the post-tonic sequence of all these COMPOUNDS does in fact equal a SIMPLE word; and the NON-TONIC STRONG stress on Position 3 of the COMPOUNDS does prevent a sequence of two WEAK stresses finally.

Pattern $\overset{1}{\smile}\overset{2}{\circ}\overset{3}{\smile}$

89. Examples: *réading-glasses*, *demagogy*, *Aristotle*, *cockneyism*, *universes*, *interpolated*, *safe-deposit*, *hydromancy*, *manicurist*.

90. Vowel distribution:

Position 1.	FORTIS	(iː) e (æ) (ɑː) (ɔ) (ɔː) (uː) ʌ əː (ei) (ai) (au)
	LENIS	i ə u o
Position 2.	FORTIS	All except /ɔi/
	LENIS	i u
Position 3.	FORTIS	(e) (ou)
	LENIS	i ə

Of the eight types of post-tonic sequence which can theoretically result from this distribution, only five have been noted:-

(a) LENIS plus FORTIS plus LENIS: very common both in SIMPLE, e.g. *abbreviated*, and in COMPOUND words, e.g. *money-order*; stress/vowel quality correlation normal in all three positions.

(b) FORTIS plus FORTIS plus LENIS: 66 examples noted from EPD; found in SIMPLE, e.g. *commentator*, and COMPOUND words, e.g. *lighthousekeeper*; for weak FORTIS in Position 1 see para. 91.

(c) LENIS plus LENIS plus LENIS: excluding *-ism*, *-minster*, *-borough* and *-bury* words, 53 examples noted from EPD most of which are COMPOUND words, e.g. *water-lilies*; for strong LENIS in Position 2 see para. 92.

(d) LENIS plus FORTIS plus FORTIS: only four words noted from EPD and all are COMPOUND, e.g. *water-polo*; for weak FORTIS in Position 3 see para. 93.

(e) FORTIS plus LENIS plus LENIS: found in *-ism* words only, e.g. *exorcism*; stress/vowel quality correlation apparently abnormal in Positions 1 and 2. See para. 94.

91. Of the 66 words exemplifying post-tonic sequence FORTIS plus FORTIS plus LENIS, 59 are forms derived (where possible) from the words given in para. 74 by the simple addition of the suffixes /iz/ as in *diphthongizes*, /iŋ/ as in *impregnating*, /id/ as in *consummated*, /ə/ as in *compensator* and /iv/ as in *concentrative*. These 59 SIMPLE words then, together with *commentator*, *defalcator* and *compurgator*, constitute a simple extension of the problem briefly dealt with in para. 74 and analysed in detail in para. 107. At the same time however we should note the differing stress treatment of the final suffixes /iz/, /iŋ/, /id/, /ə/, and /iv/. When preceded by a FORTIS vowel, as above, they take a WEAK stress; when following a LENIS vowel as in *astonishes*, *finishing*, *forwarded*, *auditor*, *accelerative*, they have a NON-TONIC STRONG stress. This varied stressing of these final suffixes provides strong evidence to support the conclusion stated in para. 71(i); the NON-TONIC STRONG stress is essential on /iz/ in *astonishes* in order to prevent a final sequence of two WEAK stresses; in *diphthongizes* LENIS /i/ of /iz/ can have its more usual correlation with WEAK stress since Position 2 with its FORTIS vowel bears a NON-TONIC STRONG stress. The four remaining words given in EPD with the post-tonic sequence FORTIS plus FORTIS plus LENIS are the COMPOUNDS *potash-water*, *epoch-making*, *cuckoo-flower* and *lighthousekeeper* in which Position 2, by the PRINCIPLE OF COMPOUND WORDS, obviously has a NON-TONIC STRONG stress. The NON-TONIC STRONG stress appropriate for the Position 1 FORTIS vowel (para. 72) in *potash*, *epoch*, *cuckoo* and *lighthouse* [71]), is therefore regularly replaced by a WEAK stress before the

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[71]) The strong stress on the second syllable of *lighthouse* is clearly attested

following NON-STRONG stress on Position 2 in the above COMPOUND words (para. 73).

92. The correlation of the post-tonic sequence LENIS plus LENIS plus LENIS with post r.s.p. ⌣o⌣ in *-ism* words, such as *cynicism, orientalism, catholicism* and the like, has been discussed in para. 80; see also paras. 81 and 82 for this same sequence occurring in English place-names ending in *-minster, -borough, -bury*. Over and above such words EPD offers 53 other examples in which LENIS plus LENIS plus LENIS corresponds to post r.s.p. ⌣o⌣. In all but six of these examples the LENIS vowel in Position 2 bears a NON-TONIC STRONG stress in accordance with the PRINCIPLE OF COMPOUND WORDS; the COMPOUNDS are mostly of the type *tiger-lily, needlewoman* but EPD also includes several of the type *sub-division, shop-assistant*. The six exceptions to which we have referred are:- *chickabiddy, piccaninny, piccalili, caterpillar, taradiddle* and *Pumpernickel*. These can hardly be said to fall within our definition of a COMPOUND word (see footnote 18); yet their penultimate and final syllables undoubtedly constitute complete words and certainly the stressing of all six exceptions is consistent with their being COMPOUND words. In passing it is noteworthy that the vast majority of words presenting the sequence LENIS plus LENIS plus LENIS said with post r.s.p. ⌣o⌣, show LENIS /i/ in Position 2; so far as we are aware EPD gives LENIS /u/ in that position only ten times.

93. Of the sequence LENIS plus FORTIS plus FORTIS correlating with post r.s.p. ⌣o⌣ we have found only four examples:- *colour-process* /ə – ou – e/, *water-polo* /ə – ou – ou/, *super-cargo* /ə – ɑː – ou/, *fire-arrow* /ə – æ – ou/. All are COMPOUND words in which Position 2, in accordance with the PRINCIPLE OF COMPOUND WORDS, clearly bears a NON-TONIC STRONG stress. Quite often FORTIS /ou/ in Position 3 of the last three words is replaced by LENIS /o/, and the post-tonic sequence is "regularized" to LENIS plus FORTIS plus LENIS; compare *play-fellow, wheel-barrow* which can be similarly treated (para. 78). This tendency to "regularize" the post-tonic sequence, it seems to us, is never extended to *colour-process*. Thus with Position 2 established as strongly stressed, the weakness of the compulsory FORTIS /e/ in Position 3 of this word allows us, as foreshadowed in para. 78, to extend to COMPOUND words the general principle, already enunciated for SIMPLE words

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also by the use of post r.s.p. o⌣ in the plural *lighthouses* and by the PRINCIPLE OF COMPOUND WORDS.

(para. 71ii), that a sequence of two NON-TONIC STRONG stresses is never permitted finally in post r.s.p.[72]. Since we have already stated that a final sequence of two WEAK stresses is also not possible (para. 71), it follows that in *all* English words with a post-tonic sequence that is dissyllabic or longer, one of the penultimate and final syllables must have a NON-TONIC STRONG stress and the other a WEAK stress. It will be seen therefore that the stress value of the final FORTIS vowel in *process*, and other similar words with a FORTIS monosyllabic post-tonic sequence, varies: when *process* and the like are SIMPLE words the final FORTIS vowel has a NON-TONIC STRONG stress (para. 72); when they constitute the last element of a COMPOUND word the final FORTIS vowel has a WEAK stress.

94. The only examples we have discovered of the correlation between post r.s.p. ⌣**o**⌣ and the post-tonic sequence FORTIS plus LENIS plus LENIS are the following *-ism* words:- *Parnellism*, *exorcism*, *Hebraism*[73], *archaism*[73], *Judaism*[73] and *Forsyte-ism*. The stress behaviour of *-ism* words we have already discussed in para. 80. There, it will be remembered, we concluded that from a stress point of view *-ism* words behave exactly like COMPOUNDS and are to be treated as such. We must admit however that even an extension of our definition of a COMPOUND word (compare footnote 18) so as to admit *-ism* as a *word* element does not always allow us to resolve *-ism* words into two complete words. In the majority of cases they can be so resolved but examples like *syllogism*, *catechism*, and *animism*, as well as *exorcism*, *Hebraism*, *archaism* and *Judaism* above, do not allow this simple division. It was with this logical difficulty in mind that we refrained from saying that *-ism* words are COMPOUNDS: they merely behave as such. Finally we should note that except for the six examples given above and other similar *-ism* words the post-tonic sequence FORTIS plus LENIS plus LENIS always indicates post r.s.p. **o**⌣**o**.

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[72] Compare for example in this connection the weakness of the penultimate FORTIS vowel preceding the strongly stressed final FORTIS in *relay-race* post r.s.p. ⌣**o** and *telegraph-pole* post r.s.p. ⌣⌣**o**.

[73] Had we extended our LENIS vowel category to include a vowel of the /e/ type (see footnote 61) this word would have afforded us an additional example of such a LENIS vowel.

1 2 3
Pattern ⌣⌣o

95. Examples: *etiolate, conventionalize, emery-wheel, calculable, water-supply, sugariness, succulently, amiableness, deteriorate* [74].

96. Vowel distribution:

Position 1.	LENIS	i ə (u) (o)
Position 2.	FORTIS	(ɑ:) (ɔ) (ə:) (ei)
	LENIS	i ə (u) o
Position 3.	FORTIS	All except /ə:/ and /ɛə/
	LENIS	i ə (u)

Only four of the eight possible vowel sequence types that can arise from this distribution have been found:-

(a) LENIS plus LENIS plus FORTIS: very common both in SIMPLE, e.g. *americanize*, and in COMPOUND words, e.g. *battering-ram*; stress/vowel quality correlation normal in all positions.

(b) LENIS plus LENIS plus LENIS: very common in SIMPLE words, e.g. *ignominy*, rare in COMPOUND words, e.g. *cookery-book*; for strong LENIS in Position 3 see para. 98.

(c) LENIS plus FORTIS plus FORTIS: rare in SIMPLE words, e.g. *monophthongizes*, not very common in COMPOUND words, e.g. *telegraphpole*; for weak FORTIS in Position 2 see para. 99.

(d) LENIS plus FORTIS plus LENIS: only one possible example found of this sequence, the COMPOUND word *tablespoonful*; stress/vowel quality correlation apparently abnormal in Positions 2 and 3. See para. 100.

97. The COMPOUND words illustrating the normal vowel sequence LENIS plus LENIS plus FORTIS are of two types: trisyllable plus monosyllable, as in *Nottinghamshire*, and dissyllable plus dissyllable, as in *water-supply*. COMPOUNDS of the former type are further examples of the weakening of the final NON-TONIC STRONG stress in a SIMPLE word when followed in compounding by a further NON-TONIC STRONG stress (see para. 73): thus *Nottingham* as a SIMPLE word has post r.s.p. ⌣o but when compounded with *-shire*, post r.s.p. o, the NON-TONIC STRONG stress in Position 2 is replaced by a WEAK stress.

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[74] EPD /iə/ immediately following the tonic syllable taken as dissyllabic: see para. 15.

98. The two COMPOUND words we have found with the vowel sequence LENIS plus LENIS plus LENIS, namely *cookery-book* and *batchelorhood,* also illustrate the principle we have just been discussing: compare these two COMPOUNDS having post r.s.p. ◡◡o with *cookery* and *batchelor* for both of which post r.s.p. ◡o is appropriate. The NON-TONIC STRONG stress on the LENIS vowel in Position 3 of *cookery-book* and *batchelorhood* is of course in accordance with the PRINCIPLE OF COMPOUND WORDS. The SIMPLE words with this same vowel sequence likewise exemplify a principle already established (para. 71i): the NON-TONIC STRONG stress on the LENIS vowel in Position 3 of words such as *miserable* and *candidature* prevents a sequence of two WEAK stresses finally in these and similar words. Interesting in this connection are words of the type *operative, deliberative* in which Position 2 can be occupied either by LENIS /ə/ or by FORTIS /ei/: when /ə/ with a WEAK stress is used the LENIS /i/ in Position 3 takes a NON-TONIC STRONG stress; when /ei/ with a NON-TONIC STRONG stress is employed LENIS /i/ in Position 3 has its more usual correlation with WEAK stress 75).

99. For the vowel sequence LENIS plus FORTIS plus FORTIS EPD offers only six examples:-

COMPOUND words: *telegraph-pole, -post, -line, carroway-seed* 73)
SIMPLE words: *monophthongize, tergiversate.*

The WEAK stress associated with the FORTIS vowel in Position 2 of the COMPOUND words is explicable by the principle given in para. 73. The structure of these COMPOUNDS is such that many more examples than those given in EPD could certainly be found but without in any way invalidating the principle we have referred to. As for the SIMPLE words these are further examples of a FORTIS vowel occurring with a WEAK stress before another and strongly stressed FORTIS vowel; see para. 107 for a detailed consideration of those post-tonic sequences in which FORTIS immediately follows FORTIS, and, more particularly, for the simple overall principle that can be established concerning the stressing of FORTIS plus FORTIS in the post-tonic sequences of SIMPLE words. At the same time however it should be noted that a good case could be made out for treating *monophthongize* as a COMPOUND word with the morpheme *-ize* /aiz/ behaving in much the same way as the termination *-ism* (see para. 80): *-ize* always seems to have a NON-TONIC

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75) Compare also in this connection /sə:kəmstənsiz/ post r.s.p. ◡◡o and sə:kəmstænsiz/ post r.s.p. ◡o◡.

STRONG stress and when compounded with words the post r.s.p. of which ends in a NON-TONIC STRONG stress regularly sees this latter NON-TONIC STRONG stress replaced by a WEAK stress; thus *monophthong* and *American* have post r.s.p. ⌣o but *monophthongize* and *Americanize* take post r.s.p. ⌣⌣o. Such an explanation however is in our view undesirable firstly since it does not cover all instances of two successive FORTIS vowels and our own explanation does, and secondly since it therefore involves an unnecessary extension of our definition of a COMPOUND word to include *-ize* as a permitted second element.

100. Of the sequence type LENIS plus FORTIS plus LENIS we have discovered only the one doubtful example *tablespoonful*. Some speakers regularly use post r.s.p. ⌣⌣o for this word. For such speakers this is undoubtedly a COMPOUND word of three elements in which, by the simple extension of the PRINCIPLE OF COMPOUND WORDS given in para. 73, both FORTIS /uː/ in Position 2 and LENIS /u/ in Position 3 are marked with a NON-TONIC STRONG stress. The replacement of this strong stress on the FORTIS vowel in Position 2 by a WEAK stress is then comparable with the same replacement effected in *no-man's-land* (para. 73). Other speakers however, including the author, habitually treat *tablespoonful* as a COMPOUND word of two elements, *table* and *spoonful*, pronouncing it with post r.s.p. ⌣o⌣ which correlates quite normally with the word's post-tonic vowel sequence. In such a pronunciation of course only Position 2 is marked with a NON-TONIC STRONG stress by the PRINCIPLE OF COMPOUND WORDS.

101. In Position 1 /i/ and /ə/ predominate and many of the words which, in conformity with EPD, we have recorded with /o/ in this position frequently have a pronunciation with /ə/ in place of /o/ when followed by a consonant, *ignominy* and *somnolently* for example; when a vowel immediately follows however this change to /ə/ does not take place: compare *shadowiness* and *yellowishness*. In Position 2 /u/ is rare, being mostly found in adverbs ending in *-fully* such as *pitifully* and *masterfully*. All such words often have this pronunciation in /u/ replaced by another in which this vowel is either elided, as in /pitifli/ post r.s.p. ⌣o, or replaced by /ə/or syllabic /l̩/ 76), as in /pitifəli/ or /pitifl̩i/, both post r.s.p. ⌣⌣o.

102. At this point we must say something about the status of the termination *-ful*. It will be remembered that when discussing *wineglass-*

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76) For our purposes equals /ə/: see para. 13.

ful, teacupful and so forth (para. 75) we were able to show that in such cases *-ful* behaved like any other word element of a COMPOUND word and therefore took a NON-TONIC STRONG stress. This termination also takes a NON-TONIC STRONG stress in words like *pitiful* and *masterful,* both post r.s.p. ⌣o, but in such cases it is strongly stressed not because it is to be considered as a word element of a COMPOUND but because a strong stress in Position 2 is necessary to prevent a final sequence of two WEAK stresses. That this is indeed the function of the NON-TONIC STRONG stress on *-ful* in *pitiful* and *masterful* is convincingly shown by the reversion of *-ful* to WEAK stress when the morpheme *-ly,* is added, giving *pitifully* and *masterfully* with post r.s.p. ⌣⌣o: thus *pitiful* and *pitifully* are in every way comparable with *astonishing* and *astonishingly,* for example, and are therefore SIMPLE words. We must then distinguish between
(a) *-ful* added to words to form nouns of measure: *bucketful*
(b) *-ful* added to words to form adjectives: *fanciful.*
Words of type (a) are treated as COMPOUNDS and *-ful* always has a NON-TONIC STRONG stress; words of type (b) are SIMPLE and *-ful* has a WEAK stress unless final after a further LENIS vowel. Thus *ear-ful, handful, armful* take post r.s.p. o, *awful, soulful* take post r.s.p. ⌣. It is of course no coincidence that *-ful* in type (a) words is never pronounced /fəl/ or /fl̩/: these pronunciations are limited to words of type (b).

1 2 3 4
Pattern ⌣⌣o⌣

103. Examples: *etiolated, livery-stable, heterodoxy.*
water-diviner, multiplicator, tubercularizes,
chairomancy, materialism 77), *arianizing* 77).

104. Vowel distribution:

Position 1.	LENIS	i ə u o
Position 2.	FORTIS	(i:) (e) (ɑ:) (ɔ) (u:) (ə:)
	LENIS	i ə u o
Position 3.	FORTIS	(e) (æ) (ɑ:) (ɔ) (u:) (ʌ) ei (ou) ai (au)
	LENIS	i
Position 4.	LENIS	i ə

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77) EPD /iə/ occurring immediately after the TONIC STRONG stress taken as dissyllabic: see para. 15.

The four vowel sequence types which can result from this distribution have all been found though only that sequence which correlates quite normally with post r.s.p. ◡◡o◡ can be said to occur commonly. The four sequence types are:-

(a) LENIS plus LENIS plus FORTIS plus LENIS: common in both SIMPLE, e.g. *regularizes*, and COMPOUND words, e.g. *emery-powder*; stress/vowel quality correlation normal in all positions.

(b) LENIS plus LENIS plus LENIS plus LENIS: only found in *-ism* words; for the strong LENIS in Position 3 see para. 106.

(c) LENIS plus FORTIS plus LENIS plus LENIS: again only found in *-ism* words; for weak FORTIS in Position 2 and strong LENIS in Position 3 see paras. 106 and 80.

(d) LENIS plus FORTIS plus FORTIS plus LENIS: the few examples include both SIMPLE and COMPOUND words; for weak FORTIS in Position 2 see para. 107.

105. The COMPOUND words which exemplify the "regular" sequence LENIS plus LENIS plus FORTIS plus LENIS are of two types: trisyllable plus dissyllable, such as *cabinet-maker* and *policy-holder*, and dissyllable plus trisyllable, such as *sugar-refiner* and *smoking-compartment*. Compounds of the former type offer additional evidence in support of the principle that in any COMPOUND word the NON-TONIC STRONG stress occurring on the final syllable of one element when said in isolation is always replaced by a WEAK stress when the initial syllable of the following element takes a NON-TONIC STRONG stress (para. 73): compare *cabinet* and *policy*, both post r.s.p. ◡o, with *cabinet-maker* and *policy-holder*, both post r.s.p. ◡◡o◡.

106. The two sequences LENIS plus LENIS plus LENIS plus LENIS and LENIS plus FORTIS plus LENIS plus LENIS concern *-ism* words only. Examples of the former sequence are numerous and include words such as *professionalism, radicalism, positivism*. Of the latter sequence type EPD gives only six examples:- *nicotinism, monotheism, sovietism, malapropism, absolutism* and *opportunism*. For a detailed discussion of the general problem created by *-ism* words see para. 80.

107. Of the remaining sequence type, LENIS plus FORTIS plus FORTIS plus LENIS, only three examples occur in EPD, the COMPOUND word *telegraph-wire* and the SIMPLE words *monophthongizes* and *tergiversating*. Clearly these words constitute but an extension of the problem raised in para. 99 and the time has now come for us to consider

the general stress treatment of two successive FORTIS vowels in any post-tonic sequence: we have now dealt with all post r.s.p. in which FORTIS vowels occur in adjacent syllables. Two successive FORTIS vowels are found in the following post-tonic sequences:-

(a) FORTIS plus FORTIS. In SIMPLE words this always indicates post r.s.p. ◡o (para. 74); it is never correlated with post r.s.p. o◡ (para. 77b). In COMPOUND words this sequence most often corresponds to post r.s.p. ◡o (para. 73) but very occasionally to post r.s.p. o◡ (para. 78).

(b) FORTIS plus FORTIS plus LENIS. In SIMPLE words this sequence is appropriate only to post r.s.p. ◡o◡ (para. 91); it is impossible for post r.s.p. o◡o, which is confined to COMPOUND words (para. 87), and for post r.s.p. ◡◡o (para. 96). In COMPOUND words likewise post r.s.p. ◡o◡ is the only pattern possible for this sequence (para. 91): FORTIS vowels are absent from Position 1 of post r.s.p. ◡◡o (para. 96) and from Position 2 of post r.s.p. o◡o (para. 86).

(c) LENIS plus FORTIS plus FORTIS. In SIMPLE words this sequence always indicates post r.s.p. ◡◡o (para. 99); it is never correlated with post r.s.p. ◡o◡ (para. 93) and FORTIS vowels do not occur at all in Positions 2 and 3 of post r.s.p. o◡o (para. 86). In COMPOUND words this sequence most often correlates with post r.s.p. ◡◡o (para. 99) but in a very few COMPOUNDS of the type dissyllable plus dissyllable it can also indicate post r.s.p. ◡o◡ (para. 93).

(d) LENIS plus FORTIS plus FORTIS plus LENIS: In SIMPLE and COMPOUND words post r.s.p. ◡◡o◡ is the only possible interpretation of this sequence; post r.s.p. ◡◡◡o is limited to words with exclusively LENIS post-tonic sequences (para. 116) and post r.s.p. ◡o◡o does not allow FORTIS vowels in Position 3 (para. 110).

The conclusions to be drawn from these data are threefold. Firstly, of two FORTIS vowels occurring successively in any post-tonic sequence, one must have a NON-TONIC STRONG stress and the other a WEAK stress; a sequence of like stresses for FORTIS plus FORTIS is an impossibility. Secondly in SIMPLE words the first of two FORTIS vowels in the post-tonic sequence *always* has a WEAK stress and the second a NON-TONIC STRONG stress. Thirdly in COMPOUND words *most often* the first FORTIS is weakly stressed and the second strongly stressed; this stressing is however sometimes reversed but in *all* cases which of the two FORTIS bears the NON-TONIC STRONG stress is readily determined by the PRINCIPLE OF COMPOUND WORDS.

108. Of the FORTIS vowels occurring in Position 3 of post r.s.p. ⌣⌣o⌣ /ei/ and /ai/ are much more common than the others quoted in para. 104. In fact considering all post-tonic sequences of four or more syllables we find that these two vowels are the only members of the FORTIS category to occur at all frequently.

Pattern $\overset{1\,2\,3\,4}{\smile o \smile o}$

109. Examples: *undeviatingly, gesticulatory, classifiable, octosyllable, qualitatively, booking-offices, understudying, notifiable, ironmongery.*

110. Vowel distribution:

Position 1.	LENIS	i ə u (o)
Position 2	FORTIS	æ ɔ (u:) (ʌ) (ə:) ei ai
	LENIS	i
Position 3.	LENIS	i ə
Position 4.	FORTIS	(i:)
	LENIS	i ə

Three of the four vowel sequence types that can arise from this distribution have been found in EPD:-

(a) LENIS plus FORTIS plus LENIS plus FORTIS: this sequence in which the stress/vowel quality correlation is completely normal is almost non-existent in EPD. The only examples we have discovered are the SIMPLE word *generatrices* and the COMPOUND *powder-magazine*. It seems certain that many more COMPOUND words could be found in which this post-tonic correlates with post r.s.p. ⌣o⌣o, e.g. *telephone-account*.

(b) LENIS plus FORTIS plus LENIS plus LENIS: the only common sequence for post r.s.p. ⌣o⌣o; occurs in SIMPLE, e.g. *executable*, and COMPOUND words, e.g. *shooting-gallery*; for strong LENIS in Position 4 see para. 111.

(c) LENIS plus LENIS plus LENIS plus LENIS: occurs mostly in a comparatively small number of COMPOUND words, e.g. *octosyllable, dancing-mistresses*; for the strong LENIS vowel in Position 4 see para. 111 and in Position 2 see para. 112. This sequence is also appropriate for the SIMPLE words *baronetages, qualificative* and, possibly, *spiritually*; see para. 113.

111. Words having either the second or the third of the above

sequence types provide further evidence for the conclusion given in para. 71 (i): the occurrence of a NON-TONIC STRONG stress on the LENIS vowel in Position 4 prevents a sequence of two WEAK stresses finally in all such words.

112. The correlation of a NON-TONIC STRONG stress with LENIS /i/ in Position 2 is almost always explicable by the PRINCIPLE OF COMPOUND WORDS. So far as EPD is concerned the COMPOUNDS here relevant are limited to:- *dancing-mistresses*, *riding-mistresses*, *oyster-fishery* and those derived by adding the word *syllable* to the following prefixes which, in the resulting COMPOUNDS, bear the TONIC STRONG stress on their initial syllable: *mono-*, *tetra-*, *octo-*, *deca-*, *poly-*.

113. The two SIMPLE words *baronetages* and *qualificative* with LENIS /i/ strong in Position 2 are of great interest. If we consider the whole range of post r.s.p. two important facts immediately stand out. Firstly the LENIS group of vowels can be divided into two sub-groups: (a) LENIS /ə/ and /o/ which are never strongly stressed non-finally in a post-tonic vowel sequence [78]; (b) LENIS /i/ and /u/, and especially the former, which are often strongly stressed non-finally in the post-tonic sequence of COMPOUND words such as *kingfisher*, *games-mistress*, *pork-butcher*, *needlewoman*. Secondly a sequence of three WEAK stresses in post r.s.p. is limited to Positions 1, 2 and 3 of post r.s.p. ⌣⌣⌣o; and Position 2 of this pattern is always occupied by LENIS /ə/ which, as we have stated, never has a NON-TONIC STRONG stress non-finally in a post-tonic vowel sequence. From these facts we must conclude that the correlation of NON-TONIC STRONG stress with a non-final LENIS /i/ or /u/, not being otherwise quite impossible, is imperative when it prevents the very rare sequence of three WEAK stresses and does not at the same time give rise to the impossible sequence of two NON-TONIC STRONG stresses or to a post r.s.p. which does not otherwise exist. *Baronetages* and *qualificative* are clear examples of LENIS /i/, in Position 2, being so correlated with NON-TONIC STRONG stress. All we can offer in respect of LENIS /u/ is the doubtful example *spiritually* /i – u – ə – i/ where EPD /uə/ is taken as dissyllabic.

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[78] LENIS /o/ post-tonically never has a NON-TONIC STRONG stress. LENIS /ə/ as we have seen may take such a stress when the final term of a post-tonic sequence in which it is preceded by a weakly stressed LENIS vowel; but see paras. 82 and 83 for two possible exceptions to the general weakness of non-final LENIS /ə/.

Undoubtedly this word is often said with post r.s.p. ◡o◡o and with EPD /uə/ constituting a dissyllable; but with /u/ thus rhythmically stronger than the following /ə/ we should, according to our statement in para. 15, logically regard EPD /uə/ as monosyllabic. However *spiritually* can also be pronounced /spiritjuli/ or even /spiritʃwəli/ (not in EPD), both of which pronunciations offer an exclusively LENIS post-tonic sequence correlating quite normally with post r.s.p. ◡◡o.

114. In Position 1 LENIS /o/ is rare: the only examples in EPD are *monosyllable* and *octosyllable* and in both words /o/ can be replaced by /ə/. In position 2 FORTIS /ei/ and /ai/ occur much more frequently than any of the other vowels appropriate for that position.

             1 2 3 4
Pattern ◡◡◡o

115. Examples: *reasonableness, tributarily, charitableness, osculatory, formidableness, interminableness, stationarily, respiratory, variableness* 79).

116. Vowel distribution 80):

Position 1.	LENIS	i ə u
Position 2.	LENIS	ə
Position 3.	LENIS	i ə
Position 4.	LENIS	i

117. This post r.s.p. is appropriate only for words that present an all-LENIS post-tonic sequence and the correlation of NON-TONIC STRONG stress with a LENIS vowel in Position 4 is, in general terms, to be considered normal since it obviates a final sequence of two WEAK stresses (para. 71i). The vast majority of our examples however are words formed by adding the morphemes *-ly* and *-ness* to other, complete, words having post r.s.p. ◡◡o: compare *stationary* and *charitable*, both post r.s.p. ◡◡o, with *stationarily* and *charitableness*. This structure immediately suggests that we may here be dealing with words which, like those ending in *-ism* for example (para. 80), are stressed as if they were COMPOUND. In other words the NON-TONIC STRONG stress on the LENIS vowel in Position 4 of *stationarily* and *charitableness* may be comparable, not with the NON-TONIC STRONG stress on the LENIS

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79) EPD /iə/ taken as dissyllabic: see para. 15.

80) /ə/ could be added to Position 4 if the pronunciation /nəs/ for *-ness* were considered in addition to /nis/.

vowel in Position 3 of the SIMPLE word *capitulary* /u – ə – i/ post r.s.p. ◡◡o in which Position 3 is strong only to prevent a final sequence of two WEAK stresses, but rather with the NON-TONIC STRONG stress on the LENIS vowel in Position 3 of the COMPOUND word *cookery-book* /ə – i – u/ post r.s.p. ◡◡o (paras. 73, 97, 98) in which Position 3 is, as it were, strong in its own right by the PRINCIPLE OF COMPOUND WORDS. Of course whether we consider *stationarily* and *charitableness* as SIMPLE or COMPOUND-like words in no way affects their stressing: either way they will have post r.s.p. ◡◡◡o. But the solution to the problem we have posed is nonetheless vital, for without it we shall be unable to infer the stress value of the monosyllabic post-tonic sequence in *abruptly*, *abstrusely*, *abruptness*, *abstruseness* and the like.

118. If words in *-ly* and *-ness* are to be considered as COMPOUND-like these two morphemes will always take a NON-TONIC STRONG stress no matter what the quality of the vowel, FORTIS or LENIS, which precedes, just as, in the same way, *-book* in COMPOUNDS has a NON-TONIC STRONG stress whether preceded by a LENIS vowel as in *cookery-book* or by a FORTIS vowel as in *telephone-book* /i – ou – u/ post r.s.p. ◡◡o. We must therefore seek the solution to our problems in words where *-ly* and *-ness* follow a FORTIS vowel. In the case of *-ly* we need look no further than such examples as *concretely* /iː – i/ post r.s.p. o◡ and *absolutely* /ə – uː – i/ post r.s.p. ◡o◡ in which *-ly* is weakly stressed. Words in *-ly* therefore are SIMPLE and *abruptly* and *abstrusely* have post r.s.p. ◡ and a normal correlation between WEAK stress and LENIS vowel. As for *-ness* the words listed from EPD in which this morpheme follows a FORTIS vowel are:-

(a) Two-syllabled post-tonic sequence:
concreteness /iː – i/, *abjectness* /e – i/, *expertness* /əː – i/ and *sterileness*, *fragileness*, *futileness*, *uprightness* and *downrightness*, all /ai – i/.

(b) Three-syllabled post-tonic sequence:
resoluteness, *absoluteness*, *opportuneness*, all /ə – uː – i/,
destituteness /i – uː – i/, *otioseness* /i – ou – i/,
versatileness /ə – ai – i/, *prematureness* /ə – uə – i/ 81).

Some speakers habitually use post r.s.p. o◡ for words in (a) above and post r.s.p. ◡o◡ for words in (b) above; for such speakers therefore

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81) Compare /uə/ in this word with that in *spiritualism*: see para. 123.

-ness words are SIMPLE, since the stress value of LENIS /i/ varies according to the vowel quality immediately preceding. Other speakers on the other hand clearly stress *-ness* words like COMPOUNDS, using post r.s.p. ◡o for words in (a) and post r.s.p. ◡◡o for words in (b). Though from the point of view of our general thesis treating *-ness* words as SIMPLE has the advantage that the vowel quality/stress correlation thereby becomes completely normal we feel that they are best regarded as behaving like COMPOUNDS, and this for two reasons. Firstly no new principle has to be established to account for the correlation of FORTIS vowel with WEAK stress and of LENIS vowel with NON-TONIC STRONG stress. Secondly, and more important, we are thereby able to eliminate post r.s.p. ◡o◡◡o as a basic pattern of English words. The only examples of this post r.s.p. which we have found in EPD are *irreconcilableness* /ə – ai – ə – ə – i/ and *justifiableness* /i – ai – ə – ə – i/. Considering these as behaving like COMPOUND words we are thus able to analyse post r.s.p. ◡o◡◡o as a composite pattern made up of post r.s.p. ◡o◡o, appropriate for *irreconcilable* and *justifiable*, and post r.s.p. o, appropriate for the morpheme *-ness*. Reviewing the whole range of *-ness* words therefore we have:-

bitterness	post r.s.p. ◡o	equals ◡	plus o
concreteness	post r.s.p. ◡o	equals o	plus o
sea-worthiness	post r.s.p. o◡o	equals o◡	plus o
sugariness	post r.s.p. ◡◡o	equals ◡o	plus o
resoluteness	post r.s.p. ◡◡o	equals ◡o	plus o
uncompromisingness	post r.s.p. ◡o◡o	equals ◡o◡	plus o
charitableness	post r.s.p. ◡◡◡o	equals ◡◡o	plus o
justifiableness	post r.s.p. ◡o◡◡o	equals ◡o◡o	plus o

From this general behaviour of the morpheme *-ness* in dissyllabic and longer post-tonic sequences we infer that *abruptness* and *abstruseness*, like *chalk-pit* (para. 72), have post r.s.p. o.

119. At this point however we must point out that *-ness* is stressed in this way only when it is used to express "the state or condition of being......" Thus we must distinguish between, for example, *thickness* meaning "the state or condition of being thick" and *thickness* meaning "a dimension other than length or breath". With the former significance *thickness* is stressed as if it were a COMPOUND word, taking post r.s.p. o. When it indicates a dimension however *thickness* is treated as a SIMPLE word and is said with post r.s.p. ◡. That this is so is

convincingly shown by the use of post r.s.p. ◡o in the plural *thicknesses* /i – i/ which is comparable with the SIMPLE word *advantages* /i – i/ and sharply differentiated from the COMPOUND *greenfinches* /i – i/, post r.s.p. o◡. Similar considerations apply to *highness* which takes post r.s.p. o or post r.s.p. ◡ according to whether it means "the state or condition of being high" or is used as a royal title [82].

120. Mention must now be made of three other *-ness* words in which a FORTIS vowel precedes this morpheme but which for clarity of presentation were omitted from the list given in para. 118; they are *lukewarmness* /ɔ: – i/, *purblindness* /ai – i/ and *colourblindness* /ə – ai – – i/. The first two invariably have post r.s.p. o◡ and the last post r.s.p. ◡o◡, *-ness* taking a WEAK stress even though semantically comparable with *-ness* of the words in para. 118. It seems clear that *-ness* in these three words has a WEAK stress in order to avoid a sequence of two NON-TONIC STRONG stresses finally: the syllable immediately preceding *-ness* must have a NON-TONIC STRONG stress since it corresponds to the TONIC STRONG stress in *warmness* and *blindness*. This stressing of *-ness* in these three words is therefore rather similar to that of the final syllable in *colour-process* (para. 93): *warmness* and *blindness*, like *process*, take a NON-TONIC STRONG stress finally when said in isolation but as the second element of COMPOUND words show a WEAK stress finally. Contrast this treatment with that of *no-man's-land* (para. 73) and *wineglassful* (para. 75) both of which are said with post r.s.p. ◡o rather than post r.s.p. o◡ since their final NON-TONIC STRONG stress also corresponds to a TONIC STRONG stress.

121. There remains for us to consider the status of post r.s.p. ◡◡◡o. In our view this post r.s.p. is best regarded as a variant of post r.s.p. ◡o◡o when Position 2 is occupied by LENIS /ə/: this latter vowel can only take a NON-TONIC STRONG stress when final in a polysyllabic post-tonic sequence (para. 113). Our reasons for this view are threefold. Firstly the parallel with p.r.s.p. o◡◡◡, itself a variant under very similar conditions of p.r.s.p. o◡o◡, is too exact to be coincidental. Secondly ◡◡◡o is the only post r.s.p. to present a sequence of three WEAK stresses, a sequence which as we have seen in the cases of

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[82] Thus, for us, *minus* and *slyness*, quoted by Trager and Bloch (*Syllabic Phonemes of English*, *op. cit.*, p. 225), are distinguished not only by juncture features but also by stress: *minus* has post r.s.p. ◡ and *slyness* post r.s.p. o.

baronetages and *qualificative* (para. 113) is avoided where possible by the unusual correlation of NON-TONIC STRONG stress with LENIS /i/ in non-final positions in SIMPLE words. Thirdly post r.s.p. ◡◡◡o is a very unstable pattern: many speakers now-a-days make some attempt to obviate the sequence of three WEAK stresses in the words we are considering by eliding one or other of the non-final LENIS vowels. Thus Position 1 LENIS is elided in /sep(ə)rəblnis/and /intəːm(i)nəblnis/, Position 2 LENIS in /invɔlənt(ə)rinis/and /tribjut(ə)rili/, Position 3 LENIS in /rispaiərət(ə)ri/ and /ɔskjulət(ə)ri/, for all of which words post r.s.p. ◡◡o is then appropriate.

Longer Patterns

122. The number of SIMPLE words with five post-tonic syllables is small and so far as we are aware there are no SIMPLE words with six or more such syllables. Of course in the process of word compounding longer sequences can quite easily arise but their stressing is readily determined by reference to the pre-tonic and post-tonic rhythmic stress patterns which we have been studying and by reference to the general principles, applicable to COMPOUNDS, which have emerged in our study. Of especial importance in this connection are

(a) the PRINCIPLE OF COMPOUND WORDS (para. 10b) according to which *soapflake-manufacturer* for example has a basic (that is, corresponding to a TONIC STRONG stress) NON-TONIC STRONG stress on its second and fifth syllables and

(b) the principle enunciated in para. 73: when in word compounding two NON-TONIC STRONG stresses are brought into juxtaposition the NON-TONIC STRONG stress nearer the tonic syllable is replaced by a WEAK stress. In *soapflake-manufacturer* therefore the basic NON-TONIC STRONG stress on its second syllable is replaced by a WEAK stress before the NON-TONIC STRONG stress of its third syllable. Thus the stressing of this COMPOUND is (i) TONIC STRONG stress on its initial syllable, (ii) NON-TONIC STRONG stress on its third, fifth and seventh syllables, (iii) WEAK stress on the remaining syllables. The vowel quality/stress correlation is strictly normal except in the second syllable which has a weak FORTIS /ei/ (see above) and in the seventh syllable which has a strong LENIS /ə/ (see para. 71i).

123. The only five-syllabled pattern which may be considered

basic to English words 83) is post r.s.p. ⌣⌣o⌣o. It is however an unstable pattern: all the SIMPLE words we have found illustrating this post r.s.p. readily allow the elision of one of the LENIS vowels in the post-tonic sequence and all can thus be said with an appropriate four-syllabled post r.s.p. EPD offers eight words for which post r.s.p. ⌣⌣o⌣o is possible:-

(a) SIMPLE: *generalizable* /ə – ə – ai – ə – ə/ and *amplificatory*, *qualificatory*, *justificatory* and *purificatory* all with /i – i – ei – ə – i/. In the case of *generalizable* Position 1 /ə/ is most often elided and this word then takes post r.s.p. ⌣o⌣o. The remaining examples allow the elision of /ə/ in Position 4 and post r.s.p. ⌣⌣o⌣ results. The reversion to a WEAK stress of the final LENIS /i/, now immediately preceded by the strong FORTIS /ei/, is a very clear indication of the function of the NON-TONIC STRONG stress appropriate for the final LENIS /i/ when the elision is not made (see para. 71i).

(b) COMPOUND: *sugar-refinery* /ə – i – ai – ə – i/, *fire-insurances* /ə – i – uə – ə – i/, *fire-extinguisher* /ə – i – i – i – ə/. In all three words post r.s.p. ⌣⌣o⌣o is clearly composite and equals post r.s.p. ⌣ plus post r.s.p. ⌣o⌣o.

124. Finally mention must be made of *spiritualism*. Of the stress in this word varying interpretations are possible. With EPD /uə/ taken as dissyllabic (para. 15) *spiritualism* may be considered to have

(a) Post r.s.p. ⌣⌣⌣o⌣: this pattern arises quite normally from the compounding of *spiritual*, post r.s.p. ⌣⌣o with *-ism*, post r.s.p. o⌣ (para. 73).

(b) Post r.s.p. ⌣o⌣o⌣: basically the argument is as in (a) above but here LENIS /u/ in Position 2 takes a NON-TONIC STRONG stress to prevent a sequence of three WEAK stresses. Compare the NON-TONIC STRONG stress on LENIS /i/ under similar conditions in *baronetages* and *qualificative* and also possibly on LENIS /u/ in *spiritually* (para. 113). There is a third possibility, post r.s.p. ⌣⌣o⌣ which may arise in two ways. Firstly LENIS /ə/ in EPD /uə/ may always be elided. Secondly EPD /uə/ may in this word be taken as FORTIS, and therefore monosyllabic, since a weak FORTIS, though of infrequent occurrence, is permitted before the termination *-ism* (para. 80). On balance we incline to this last interpretation of the stressing of *spiritualism*

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83) See para. 118 for the analysis of post r.s.p. ⌣o⌣⌣o as a composite pattern.

since /uə/ behaves similarly in *prematureness* (para. 118) and since /uə/ both in *spiritualism* and *prematureness* is comparable with /uə/ occurring in the COMPOUND word *manicure-set*, post r.s.p. ◡◡o equals post r.s.p. ◡o plus post r.s.p. o. Furthermore if *spiritualism* is considered to have post r.s.p. ◡◡o◡ our statement of post r.s.p. basic to English words is simplified since post r.s.p. ◡◡◡o◡ and/or post r.s.p. ◡o◡o◡ are thereby eliminated.

VI. BASIC AND COMPOSITE RHYTHMIC STRESS PATTERNS

125. In the preceding chapters we have attempted to demonstrate the high degree of correlation which exists in English words between FORTIS vowel and NON-TONIC STRONG stress on the one hand and between LENIS vowel and WEAK stress on the other; and when in a small minority of words this correlation appears to break down we have most times been able to elucidate certain distributional factors to account for the association of FORTIS vowel with WEAK stress and of LENIS vowel with NON-TONIC STRONG stress. We must now turn to the second part of our thesis and make clear the distributional relationships that exist between our three categories of stress. In the course of the foregoing analysis we have at various points commented on the status of the various r.s.p. that we have set forward and we have distinguished between what we have called *basic* and *composite* patterns. The significance of this distinction lies in the fact that it is from the *basic*, not from the *composite*, patterns that the essential distributional relationships between the three stress categories will emerge. In general terms composite r.s.p. are derived from words involving separable prefixes and from COMPOUND words; as we have seen the stress of words of the former type is subject to a good deal of variation and the stress of SIMPLE words is apt to be different from that of the same words when participating in COMPOUNDS. Therefore before proceeding to the second part of our task we must first give a complete list of the basic and composite r.s.p. At the same time we take the opportunity which this listing affords of summarizing the findings of the previous chapters and of indicating, in the case of the composite patterns, the manner of their composition.

126. *Basic Pre-tonic Rhythmic Stress Patterns*

P.r.s.p. o

Vowel sequence: FORTIS or LENIS, being the vowel in (a) a separable monosyllabic prefix or (b) the monosyllabic pre-tonic sequence of COMPOUND words taking the TONIC STRONG stress initially on the second word element, e.g. *arm-chair*, *king-pin*. This p.r.s.p. has an optional variant, p.r.s.p. ⌣, which is more common for prefixes.

P.r.s.p. ⌣

Vowel sequence: FORTIS or LENIS when occurring in monosyllabic pre-tonic sequences which do not equal (a) or (b) in p.r.s.p. o above.

P.r.s.p. o⌣

Vowel sequence: any two-term combination of FORTIS and LENIS. This pattern is basic to separable dissyllabic prefixes (vowel sequence: $\left.\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS) but is composite when it coincides with a dissyllabic pre-tonic sequence beginning with a separable monosyllabic prefix.

P.r.s.p. ⌣o⌣

Vowel sequence[84]: LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS in which Position 3 is not a separable monosyllabic prefix and in which Position 2, if LENIS /i/, is strong either by the higher ranking of LENIS /i/ (HR) or by the PRINCIPLE OF RELATED WORDS (PRW).

P.r.s.p. o⌣⌣

Vowel sequence: $\left.\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right.$ in which Position 3 does not equal a separable monosyllabic prefix, in which Positions 3 and 2 together do not equal a separable dissyllabic prefix and in which Position 3, if LENIS /i/, is strong either by HR or by PRW.

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[84] In this and all subsequent trisyllabic and longer vowel sequences we omit reference to any word not conforming to such sequences. These words, as we have seen, are very few in number and are fully dealt with in the preceding chapters.

P.r.s.p. ⌣o⌣⌣

Vowel sequence: LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right.$ in which Position 4 does not equal a separable monosyllabic prefix and in which Position 3, if LENIS /i/, is strong either by HR or PRW.

P.r.s.p. o⌣o⌣

Vowel sequence: $\left.\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS in which Position 4 does not equal a separable monosyllabic prefix, in which Positions 4 and 3 together do not equal a separable dissyllabic prefix and in which Position 2, if LENIS /i/, is strong by PRW. This pattern has an optional variant, p.r.s.p. o⌣⌣⌣, which however is compulsory for words having a LENIS vowel other than /i/ in Position 2.

P.r.s.p. o⌣o⌣⌣

Vowel sequence: entirely LENIS in which Position 5 does not equal a separable monosyllabic prefix, in which Positions 5 and 4 together do not equal a separable dissyllabic prefix and in which Positions 3, always LENIS /i/, is strong by PRW. This is a rare basic p.r.s.p. and shows many signs of instability.

P.r.s.p. ⌣o⌣⌣⌣

Vowel sequence: LENIS plus FORTIS plus LENIS plus LENIS /ə/ plus FORTIS in which Position 5 does not equal a separable monosyllabic prefix. As a basic p.r.s.p. this is rare and, like p.r.s.p. o⌣o⌣⌣, is very unstable.

127. *Composite Pre-tonic Rhythmic Stress Patterns*

These composite patterns arise when basic p.r.s.p. o equals separable monosyllabic prefix precedes basic p.r.s.p. ⌣, o⌣, ⌣o⌣, o⌣⌣, ⌣o⌣⌣ and o⌣o⌣, and when basic p.r.s.p. o⌣ equals separable dissyllabic prefix precedes basic p.r.s.p. ⌣, o⌣, ⌣o⌣ and o⌣⌣. Thus

P.r.s.p. o⌣	in *disconnect*	equals o	plus ⌣
P.r.s.p. oo⌣	in *re-distribution*	equals o	plus o⌣
P.r.s.p. oo⌣⌣	in *denationalization*	equals o	plus o⌣⌣

P.r.s.p. o⌣o⌣ in *reconsideration* equals o plus ⌣o⌣
P.r.s.p. o⌣o⌣⌣ in *unintelligibility* equals o plus ⌣o⌣⌣
P.r.s.p. oo⌣o⌣ in *incomprehensibility* equals o plus o⌣o⌣
P.r.s.p. o⌣⌣ in *intercollegiate* equals o⌣ plus ⌣
P.r.s.p. o⌣o⌣ in *autobiographic* equals o⌣ plus o⌣
P.r.s.p. o⌣⌣o⌣ in *intercommunication* equals o⌣ plus ⌣o⌣
P.r.s.p. o⌣o⌣⌣ in *internationalization* equals o⌣ plus o⌣⌣

This relatively simple scheme is complicated by the fact that basic p.r.s.p. o of separable monosyllabic prefixes may have a variant, p.r.s.p. ⌣, when followed by a basic pattern commencing with a NON-TONIC STRONG stress; furthermore some of the other basic p.r.s.p. show a tendency to variation when, and only when, preceded by one of the two basic p.r.s.p. appropriate to separable prefixes. Thus

Basic p.r.s.p. o *has variant p.r.s.p.* ⌣ *in*

P.r.s.p. ⌣o⌣ in *dissatisfaction* equals ⌣ plus o⌣
P.r.s.p. ⌣o⌣⌣ in *disorganization* equals ⌣ plus o⌣⌣
P.r.s.p. ⌣o⌣o⌣ in *incomprehensibility* equals ⌣ plus o⌣o⌣
P.r.s.p. ⌣o⌣⌣⌣ in *incomprehensibility* equals ⌣ plus o⌣⌣⌣

Basic p.r.s.p. o⌣ *has variant p.r.s.p.* ⌣⌣ *in*

P.r.s.p. o⌣⌣ in *unascertainable* equals o plus ⌣⌣.
P.r.s.p. o⌣⌣⌣ in *overestimation* equals o⌣ plus ⌣⌣

Basic p.r.s.p. ⌣o⌣ *has variant p.r.s.p.* ⌣⌣⌣ *in*

P.r.s.p. o⌣⌣⌣ in *reconsideration* equals o plus ⌣⌣⌣

Basic p.r.s.p. o⌣⌣ *has variant p.r.s.p.* ⌣⌣⌣ *in*

P.r.s.p. o⌣⌣⌣ in *reorganization* equals o plus ⌣⌣⌣

Basic p.r.s.p. o⌣o⌣ *has variant p.r.s.p.* o⌣⌣⌣ *in*

P.r.s.p. oo⌣⌣⌣ in *incomprehensibility* equals o plus o⌣⌣⌣
P.r.s.p. ⌣o⌣⌣⌣ in *incomprehensibility* equals ⌣ plus o⌣⌣⌣

128. *Basic Post-tonic Rhythmic Stress Patterns*

These basic patterns are derived mostly from SIMPLE words but also from COMPOUNDS in which the second word element consitutes the whole of the post-tonic sequence.

Post r.s.p. ⌣

Vowel sequence: LENIS, in SIMPLE words only.

Post r.s.p. o

Vowel sequence: FORTIS in SIMPLE words, FORTIS or LENIS in COMPOUNDS including *-ism* 85), *-borough* 86), *-bury* 87), *-ful* 88), and *-ness* 89) words. For some speakers post r.s.p. ⌣ is an optional variant in *-borough* and *-bury* words.

Post r.s.p. ⌣o

Vowel sequence: any two-term combination of FORTIS and LENIS except FORTIS plus LENIS, occurring in SIMPLE words.

Post r.s.p. o⌣

Vowel sequence: FORTIS plus LENIS in SIMPLE words and any two-term combination of FORTIS and LENIS in COMPOUND words of the type *greengages*, in *-ism* 90), *-minster* and, possibly, *-borough* 91) and *-bury* 92) words. In all COMPOUND words Position 1 if LENIS is strong by the PRINCIPLE OF COMPOUND WORDS (PCW).

Post r.s.p. o⌣o

Vowel sequence: $\left.\begin{array}{l}\text{FORTIS}\\ \text{LENIS /i/,/u/}\end{array}\right\}$ plus LENIS plus LENIS only in COMPOUND words of the type *tea-services* in which Position 1 if LENIS is strong by PCW.

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85) If pronounced /izm/ equals monosyllable.
86) Pronounced /brə/: see para. 82.
87) Pronounced /bri/: see para. 82.
88) When equal to noun of measure: see para. 102.
89) When indicating "the state or condition of being....": see paras. 118–119.
90) If pronounced /izəm/ equals dissyllable.
91) If pronounced /bərə/ or /bʌrə/: see para. 82.
92) If pronounced /bəri/ or /beri/: see para. 82.

Post r.s.p. ◡o◡

Vowel sequence: $\left.\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right\}$ plus FORTIS plus LENIS in SIMPLE words and LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS in COMPOUNDS of the type *shop-assistant* in which Position 2 if LENIS /i/ is strong by PCW.

Post r.s.p. ◡◡o

Vowel sequence: LENIS plus LENIS plus $\left\}\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right.$ and LENIS plus FORTIS plus FORTIS in SIMPLE words only.

Post r.s.p. ◡◡o◡

Vowel sequence: LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right\}$ plus FORTIS plus LENIS, in SIMPLE words only.

Post r.s.p. ◡o◡o

Vowel sequence: LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS /i/}\end{matrix}\right\}$ plus LENIS plus $\left\{\begin{matrix}\text{FORTIS}\\ \text{LENIS}\end{matrix}\right.$, in SIMPLE words only. This pattern has an optional variant post r.s.p. ◡◡◡o which however is compulsory for words having a LENIS vowel other than /i/ and, possibly /u/ (see para. 113), in Position 2.

Post r.s.p. ◡◡o◡o

Vowel sequence: exclusively LENIS except for FORTIS in Position 3, in SIMPLE words only. A very unstable pattern.

129. *Composite Post-tonic Rhythmic Stress Patterns*

These composite patterns are derived entirely from COMPOUNDS and *-ful* 88), *-ness* 89), *-ism*, *-minster*, *-borough* and *-bury* words. In most cases at least one syllable of the first word element lies within the post-tonic sequence. In the remainder the post-tonic sequence of the whole COMPOUND is in itself the complete vowel sequence of another COMPOUND word. The following list of composite patterns is certainly not exhaustive: it is based solely on the EPD word-list and word compounding is such an extensive and extending process that any sample of English words, no matter how large or representative, cannot possibly cover the whole range of COMPOUND word types. We are confident however that the post r.s.p. of COMPOUND word types, not dealt with here, conform to the general principles enunciated in Chapter V and can be analysed in much the same way as the following composite patterns.

Post r.s.p. ⌣o in COMPOUNDS of the type *reading-room* with Position 1 LENIS equals ⌣ plus o.

Post r.s.p. ⌣o in COMPOUNDS of the type *statute-book* with Position 1 FORTIS equals o plus o.

Post r.s.p. ⌣o in COMPOUNDS of the type *wineglassful* equals o plus o.

Post r.s.p. o⌣ in COMPOUNDS of the type *lukewarmness* equals o plus o.

Post r.s.p. o⌣o in COMPOUNDS of the type *blameworthiness* equals o⌣ plus o.

Post r.s.p. ⌣o⌣ in COMPOUNDS of the type *reading-glasses* with Position 1 LENIS equals ⌣ plus o⌣.

Post r.s.p. ⌣o⌣ in COMPOUNDS of the type *epoch-making* with Position 1 FORTIS equals o plus o⌣.

Post r.s.p. ⌣o⌣ in COMPOUNDS of the type *lighthousekeeper* equals o plus o⌣.

Post r.s.p. ⌣o⌣ in COMPOUNDS of the type *water-polo* with Position 1 LENIS and Position 3 FORTIS equals ⌣ plus oo.

Post r.s.p. ⌣⌣o in COMPOUNDS of the type *water-supply* with Position 1 LENIS equals ⌣ plus ⌣o.

Post r.s.p. ⌣⌣o in COMPOUNDS of the type *telegraph-pole* with Position 2 LENIS or FORTIS equals ⌣o plus o.

Post r.s.p. ⌣⌣o in COMPOUNDS of the type *tablespoonful* with Positions 2 and 3 FORTIS or LENIS equals ⌣ plus o plus o.

Post r.s.p. ⌣⌣o⌣ in COMPOUNDS of the type *livery-stable* with Position 2 FORTIS or LENIS equals ⌣o plus o⌣.

Post r.s.p. ⌣⌣o⌣ in COMPOUNDS of the type *sugar-refining* with Position 1 LENIS equals ⌣ plus ⌣o⌣.

Post r.s.p. ⌣o⌣o in COMPOUNDS of the types *octosyllable* and *powder-magazine* with Position 1 LENIS equals ⌣ plus o⌣o.

Post r.s.p. ⌣o⌣o in COMPOUNDS of the type *telephone-account* with Position 2 LENIS or FORTIS equals ⌣o plus ⌣o.

Post r.s.p. ⌣⌣⌣o in COMPOUNDS of the type *charitableness* with Position 3 LENIS or FORTIS equals ⌣⌣o plus o.

Post r.s.p. ⌣⌣o⌣o in COMPOUNDS of the type *sugar-refinery* with Position 1 LENIS equals ⌣ plus ⌣o⌣o.

Post r.s.p. ⌣o⌣⌣o in COMPOUNDS of the type *justifiableness* with Position 4 LENIS or FORTIS equals ⌣o⌣o plus o.

VII. DISTRIBUTIONAL RELATIONSHIPS OF STRESS CATEGORIES

130. As we have already indicated it is from the analysis of the basic r.s.p. that the essential distributional relationships between the three stress categories, TONIC STRONG, NON-TONIC STRONG and WEAK are to be derived. Most of what we have to say in this connection has already been explicitly stated or implied at various points in chapters IV and V and the purpose of this present chapter is to summarize and present as a coherent whole these scattered indications of the structural features exhibited by the basic r.s.p. We shall also include in this summary certain other structural features which did not arise in connection with the foregoing analysis of the vowel quality/stress correlation but which are quite apparent from the basic r.s.p. as given in paras. 126 and 128.

131. If we consider the whole range of basic r.s.p. the most striking feature is undoubtedly the remarkable symmetry displayed by the pre-tonic patterns on the one hand and the post-tonic patterns on the other. The only p.r.s.p. which is not mirrored as a post r.s.p. is the basic p.r.s.p. ⌣o⌣⌣⌣. This, as we have seen (para. 64), is a rare pattern and an unstable pattern: the few examples we have found of it are frequently said with one LENIS vowel elided, thus allowing the elimination of one of the three successive WEAK stresses and the consequent use of the more common basic p.r.s.p. ⌣o⌣⌣. Post r.s.p. ⌣⌣⌣o⌣ however is not altogether an impossibility though for reasons already given (para. 124) we do not consider it as basic to English words. The two post r.s.p. which have no pre-tonic counterparts are post r.s.p. o⌣ and post r.s.p. o⌣o. These two patterns, together with post r.s.p. o, are sharply differentiated from the other post-tonic patterns in that they are wholly or for the most part derived from COMPOUND words. Post r.s.p. o⌣o is used exclusively for COMPOUND words with the NON-TONIC STRONG stress in Position 1 corresponding to the TONIC STRONG stress of the second word element when said in isolation and with the second word element (for which post r.s.p. o⌣o is appropriate) constituting the

whole of the post-tonic sequence. Post r.s.p. o and o⌣ are in many ways similar: they are used mostly for COMPOUND words with a structure comparable with that of words said with post r.s.p. o⌣o, but a minority of SIMPLE words also takes post r.s.p. o or post r.s.p. o⌣. We have found no word which might conceivably be said with a p.r.s.p. mirroring post r.s.p. o⌣o but the pre-tonic equivalent of post r.s.p. o⌣ is not unknown. P.r.s.p. ⌣o is possible for *electricity*, *idealistic* and *appointee* but with certain changes of vowel quality these three words are readily pronounced with p.r.s.p. o⌣ (para. 20). Undoubtedly the pressure exerted by p.r.s.p. o⌣, which has a virtual monopoly in all dissyllabic pre-tonic sequences, is such that p.r.s.p. ⌣o with its very few examples has little chance of surviving. At this point it is interesting to ask why post r.s.p. o⌣ does not in like fashion yield to post r.s.p. ⌣o in SIMPLE words. Undoubtedly post r.s.p. o⌣ survives since it is essential for a great number of COMPOUND words of the *kingfisher*, *bookcases* type; the pressure exerted by post r.s.p. ⌣o is then in no way of the same magnitude as that of p.r.s.p. o⌣. With the exception then of p.r.s.p. ⌣o⌣⌣⌣ and post r.s.p. o⌣ and o⌣o the pre-tonic and post-tonic r.s.p. are completely symmetrical. The significance of this symmetry is that WEAK stress and NON-TONIC STRONG stress have much the same relations in distribution, one with the other and each with TONIC STRONG stress, whether they occur before or after the TONIC STRONG stress in the word.

132. Another outstanding feature of basic r.s.p. is that a sequence of two NON-TONIC STRONG stresses is an impossibility. When it occurs medially in r.s.p. NON-TONIC STRONG stress is always preceded *and* followed by a WEAK stress; when initial in p.r.s.p. it is always followed by a WEAK stress and when final in post r.s.p. a WEAK stress must precede. This particular structural feature of basic r.s.p. has a profound effect on the composite r.s.p. and to no small extent occasions the considerable variation which composite p.r.s.p. exhibit (para. 127). When two basic r.s.p. are juxtaposed as the result of word compounding or of the addition of a monosyllabic prefix to SIMPLE words a sequence of two NON-TONIC STRONG stresses may in the first instance quite easily be brought about but in such cases most often some attempt is made to replace one or other of the two NON-TONIC STRONG stresses by a WEAK stress. Thus composite p.r.s.p. oo⌣, for example, is frequently varied to p.r.s.p. ⌣o⌣ or p.r.s.p. o⌣⌣, and the result of compounding

post r.s.p. ⌣o with post r.s.p. o, for example, is invariably composite post r.s.p. ⌣⌣o. In the case of composite p.r.s.p. arising from the addition of a monosyllabic prefix to words the p.r.s.p. of which begins with a NON-TONIC STRONG stress, it is very much a matter of individual choice which of the two juxtaposed NON-TONIC STRONG stresses is reduced though the prefix must retain its strong stress, in preference to the following syllable, if the speaker wishes in any way to insist on its meaning. With composite post r.s.p. on the other hand there appears to be no such choice and which of the two NON-TONIC STRONG stresses is to be retained is determined by the structure of the COMPOUND word. In general terms a NON-TONIC STRONG stress which occurs on the tonic syllable of the second or subsequent word element of a COMPOUND word is retained in preference to a NON-TONIC STRONG stress which does not represent the carry-over of a TONIC STRONG stress: compare for example *cookery-book*, composite post r.s.p. ⌣⌣o equals ⌣o plus o, with *colour-process*, composite post r.s.p. ⌣o⌣ equals ⌣ plus oo. If however both juxtaposed NON-TONIC STRONG stresses correspond to TONIC STRONG stresses it is the first which gives way to WEAK stress: compare for example *no-man's-land*, composite post r.s.p. ⌣o equals o plus o.

133. This general antipathy towards a sequence of two strong stresses within the basic r.s.p. is also reflected in the distributional relationship between NON-TONIC STRONG stress and TONIC STRONG stress. For the most part the immediate pre-tonic and post-tonic syllables are associated with WEAK stress and NON-TONIC STRONG stress is not possible in those two positions. The only exceptions to this general weakness of the immediate pre-tonic and post-tonic syllables are provided by p.r.s.p. o and post r.s.p. o, o⌣ and o⌣o. Quite often however the NON-TONIC STRONG stress of p.r.s.p. o, whether equal to a separable monosyllabic prefix or to the first and non-tonic-bearing word element of a COMPOUND such as *arm-chair*, is replaced by the WEAK stress of the variant p.r.s.p. ⌣ (para. 126). Clearly the use of variant p.r.s.p. ⌣ in *unnatural*, *arm-chair* and the like is an attempt to make such words conform to the more usual stressing of the immediate pre-tonic syllable. With post r.s.p. o, o⌣ and o⌣o such a weakening of the immediate post-tonic syllable apparently never takes place. This, we are convinced, is the result of the structure of words said with these patterns: post r.s.p. o⌣o is used exclusively for COMPOUND words

and the vast majority of words for which post r.s.p. o or post r.s.p. o⌣ is appropriate are likewise COMPOUND. Thus the immediate post-tonic NON-TONIC STRONG stress has to be retained since it occurs on the tonic syllable of the second word element in the COMPOUNDS. Once again post r.s.p. o, o⌣ and o⌣o are sharply differentiated from the remaining post r.s.p. since they alone allow the juxtaposition of TONIC STRONG stress and NON-TONIC STRONG stress. At one stage we did seriously consider analysing post r.s.p. o and o⌣, when occurring in COMPOUND words, together with post r.s.p. o⌣o, as *composite* patterns: we could after all regard them as zero plus o, zero plus o⌣ and zero plus o⌣o respectively but the general difficulty would remain in the case of the relatively few SIMPLE words for which either post r.s.p. o or post r.s.p. o⌣ is applicable. In the end we decided to retain these post r.s.p. as basic patterns and to state that the juxtaposition of NON-TONIC STRONG stress and TONIC STRONG stress is possible only in

(a) words beginning with a separable monosyllabic prefix which is followed by TONIC STRONG stress

(b) COMPOUNDS in which the NON-TONIC STRONG stress of the monosyllabic first element is immediately followed by a TONIC STRONG stress in the second element

(c) COMPOUNDS in which the TONIC STRONG stress of the first word element is immediately followed by the NON-TONIC STRONG stress on the tonic syllable of the second word element

(d) a few SIMPLE words in which the TONIC STRONG stress is followed by a post-tonic sequence FORTIS (equals NON-TONIC STRONG stress) or FORTIS plus LENIS (equals NON-TONIC STRONG stress plus WEAK stress).

134. We have already stated (para. 132) that, when it is a question of eliminating one of two successive NON-TONIC STRONG stresses in COMPOUND words, the NON-TONIC STRONG stress occurring on the tonic syllable of the second or subsequent word element is retained in preference to the NON-TONIC STRONG stress which does not represent the carry-over of a TONIC STRONG stress. We now need to add a rider to this general principle to cover the comparatively rare situation which arises when two successive NON-TONIC STRONG stresses are themselves preceded by a TONIC STRONG stress. In such a case the NON-TONIC STRONG stress next to the TONIC STRONG stress is always replaced by a WEAK stress irrespective of the status of either NON-

TONIC STRONG stress: thus *soapflake-manufacturer* (para. 122) shows a weakening of Position 1 rather than Position 2 though it is Position 1, not Position 2, which corresponds to a TONIC STRONG stress. Clearly the overriding consideration here is the necessity to avoid the juxtaposition of TONIC STRONG stress and NON-TONIC STRONG stress.

135. A further noteworthy feature of the basic r.s.p. is that, except when one of the WEAK stresses is a Position 1 stress, a sequence of two WEAK stresses is generally impossible. The only example of such a sequence not involving Position 1 is provided by the unstable basic p.r.s.p. ⌣o⌣⌣⌣. A succession of two WEAK stresses in adjacent syllables other than Positions 1 and 2 therefore indicates that the r.s.p. in which it is found is either a *composite* or a *variant* pattern. Thus p.r.s.p. o⌣⌣o⌣ is a composite pattern (paras. 62 and 127) whilst post r.s.p. ⌣⌣⌣o is both composite (para. 129) and variant (para. 128). A sequence of two WEAK stresses is however more readily tolerated than a sequence of two NON-TONIC STRONG stresses, as a glance at the list of variant p.r.s.p. (para 127) makes clear. Obviously the elimination of a succession of two NON-TONIC STRONG stresses can easily give rise to a sequence of two WEAK stresses not coinciding with Positions 1 and 2: thus for example the use of variant p.r.s.p. o⌣⌣⌣ in place of the composite p.r.s.p. oo⌣⌣ appropriate for *reorganization.*

136. With a sequence of two NON-TONIC STRONG stresses impossible and a sequence of two WEAK stresses virtually so except in Positions 1 and 2, the distributional relationship between NON-TONIC STRONG stress and WEAK stress in polysyllabic pre-tonic and post-tonic sequences is one of simple alternation in so far as the general weakness of Position 1 permits. The only r.s.p. exceptional in this respect is the unstable p.r.s.p. ⌣o⌣⌣⌣. And here we should note that p.r.s.p. ⌣o⌣⌣⌣ owes its status as a basic pattern to the fact that we have found no words for which p.r.s.p. ⌣o⌣o⌣ has to be considered the *basic* pattern 93). If such words were found then p.r.s.p. ⌣o⌣⌣⌣ could be regarded as a variant of basic p.r.s.p. ⌣o⌣o⌣, a variant compulsory when Position 2 equals LENIS /ə/: compare in this connection the variant status of p.r.s.p. o⌣⌣⌣ (para. 59). With p.r.s.p. ⌣o⌣⌣⌣ thus removed from the list of basic r.s.p. the simple alternation of NON-TONIC STRONG stress and WEAK stress, as we have indicated above, would then be without exception.

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93) P.r.s.p. ⌣o⌣o⌣ occurs only as a variant of composite p.r.s.p. oo⌣o⌣.

137. In view of this distributional relationship between NON-TONIC STRONG stress and WEAK stress it follows that in polysyllabic pre-tonic and post-tonic sequences one of the two syllables most remote from the TONIC STRONG stress must have a NON-TONIC STRONG stress and the other a WEAK stress; that is to say that no word with two or more syllables preceding or following the tonic syllable can begin or end with a sequence of like stresses. All polysyllabic basic r.s.p., even p.r.s.p. ⌣o⌣⌣⌣ and post r.s.p. o⌣ and o⌣o, conform to this principle, the influence of which also extends to composite post r.s.p.: thus the final NON-TONIC STRONG stress in *polo* and *warmness*, for example, is replaced by a WEAK stress in the COMPOUNDS *water-polo* (para. 93) and *lukewarmness* (para. 120). This principle is likewise the explanation of the correlation of NON-TONIC STRONG stress with a final LENIS vowel when preceded by a further and weak LENIS vowel, a correlation which must therefore be regarded as normal (para. 71i).

138. The foregoing summary of the distributional relationships between the three stress categories, relationships which we have derived from the analysis of the structure of basic r.s.p., indicates that

(a) in dissyllabic pre-tonic and post-tonic sequences the general weakness of Position 1 entails the occurrence of NON-TONIC STRONG stress in Position 2. This is invariable for pre-tonic sequences [94]. It is of course possible for post-tonic Position 1 to be strong either by its FORTIS vowel quality and or by the PRINCIPLE OF COMPOUND WORDS. In that case post-tonic Position 2 takes WEAK stress;

(b) in trisyllabic and longer pre-tonic and post-tonic sequences the crucial position is Position 3. If this position can be shown to have NON-TONIC STRONG stress, then

a three-syllabled pre-tonic sequence equals P.r.s.p. o⌣⌣
a three-syllabled post-tonic sequence equals Post r.s.p. ⌣⌣o or o⌣o [95]
a four-syllabled pre-tonic sequence equals P.r.s.p. ⌣o⌣⌣
a four-syllabled post-tonic sequence equals Post r.s.p. ⌣⌣o⌣
a five-syllabled pre-tonic sequence equals P.r.s.p. o⌣o⌣⌣
a five-syllabled post-tonic sequence equals Post r.s.p. ⌣⌣o⌣o

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[94] Only possible exceptions we have found are *electricity*, *idealistic* and *appointee*; but see paras. 20 and 131.

[95] Which of these two alternatives is determined by the general structure of the word providing the three-syllabled post-tonic sequence: post r.s.p. ⌣⌣o for SIMPLE words, post r.s.p. o⌣o for COMPOUNDS of the type *tea-services*.

If however Position 3 can be shown to have WEAK stress, then
a three-syllabled pre-tonic sequence equals P.r.s.p. ⏑o⏑
a three-syllabled post tonic sequence equals Post r.s.p. ⏑o⏑
a four-syllabled pre-tonic sequence equals P.r.s.p. o⏑o⏑
a four-syllabled post-tonic sequence equals Post r.s.p. ⏑o⏑o
a five-syllabled pre-tonic sequence equals P.r.s.p. ⏑o⏑⏑⏑.

Thus the distributional relationships which we have shown to exist between the three types of stress effectively reduce the number of combinations of WEAK stress and NON-TONIC STRONG stress in pre-tonic and post-tonic sequences of two to five syllables from a theoretical maximum of 120 to the 15 given in (a) and (b) above. This we take to be convincing proof of our statement (para. 10d) that, although TONIC STRONG stress is undoubtedly free and not tied to any given position in the word, the incidence of NON-TONIC STRONG stress and of WEAK stress is very closely related to the incidence of TONIC STRONG stress.

Conclusion

We have endeavoured in the past chapters to present a study of stress in English words in which considerations of vowel quality and stress type distribution play an equal part, in which the fundamental attitudes of Trager and Bloch and of Newman are combined. We have at no point offered a definition of stress comparable with those formulated by the authorities we have quoted (para. 3); nor do we intend to do so now. For our part we are content to extend to the word Classe's view of stress in the utterance and to regard stress as that "phenomenon which, by recurring at more or less regular intervals, creates ...... a feeling of rhythm" in English words. We do not wish our attitude to stress to be construed as necessarily rejecting all definitions of stress based on the criterion of articulatory force; indeed there can be no doubt that, in word or in utterance, those syllables coinciding with a strong rhythm beat most often have a greater articulatory force than syllables which correspond to a weak rhythm beat. Nor are we unmindful of the many and varied phonetic factors, notably length and syllable juncture, that contribute little or much according to circumstance to that feeling of rhythm. We must however re-iterate our conviction that articulatory force is frequently a difficult and, sometimes, an impossible yardstick for the recognition of linguistic stress in English and that the rhythm patterns inherent in English words form a much more reliable and indeed easier method, not only of determining the placement of the linguistic strong stress, but also of distinguishing between the two universally agreed categories of linguistic stress, namely strong and weak.

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October 1955.

REVIEW — COMPTE-RENDU

H. Kronasser, *Vergleichende Laut- und Formenlehre des Hethitischen*, Winter, Heidelberg 1956.

The author of this book has set himself the task of writing an up-to-date grammar of the Hittite language from the point of view of Indo-European linguistics. His work comprises a 'general introduction' dealing with the cultural and linguistic relations of the Hittites with other peoples, the sources of our knowledge of their languages and the scripts in which the texts are written. A word of praise is due to the author for his initiative in drawing the other languages of the Boghazköy archive, Luwian etc. into the discussion. The relevant facts are carefully marshalled and his expositions give us abundant food for thought, establishing the belief that many other authors in this field, especially in the laryngealist camp, run the risk of making many mistakes by neglecting these Anatolian relations of Hittite. Too often explications have been looked for in original Indo-European without taking into account the nearest relatives. The author is no doubt right in suggesting the possibility of a more considerable degree of non-Indo-European influence on the formation of Hittite as it is known to us than has been admitted by many other scholars (see e.g. § 72). He sometimes — and rightly — even feels compelled to attach more importance to common Anatolian phenomena than to 'Indo-European' explications (cf. e.g. p. 86). This standpoint leads him to a cautious and reserved judgement of all facts connected with Hittite *h* (§ 108 f.), without however inducing him to a perfect appreciation of the drawbacks of 'substratum theories'. With regard to other moot points also Dr. Kronasser gives evidence of a sound criticism of current or traditional views. He rightly reminds us that Hittite is not alone in being a 'mixed language' (§ 10), a point which has perhaps been too much emphasized by some of his predecessors. With regard to the Hittite *h* Dr. Kronasser is decidedly inclined to consider it a result of secondary developments (p. 76 ff.). It must be admitted that his scepticism is on the whole reasonable, because aspirates are often liable to turn up or disappear in various positions. The force of arguments based on phonetic parallels is however generally speaking illustrative, rather than conclusive.

One of the characteristics of this book is its severe — and not rarely sound — criticism of the laryngeal theory. It is indeed unwarranted to select only those elements which seem to admit of an etymologic interpretation and to construct too rigid systems of sound correspondences on the basis of very limited material, to overlook in vindicating 'laryngealist explications' many difficulties which remain unsolved, to prefer proto-Indo-European sound-laws to later developments of the individual languages if the latter may be made plausible, to forget that a satisfactory interpretation of facts is often attained at by the shva theory in its traditional form. It must moreover be admitted that many laryngealist interpretations, however ingenious, are not free from hasty generalization. These few remarks are however not to deny that they contain, generally speaking, an element of truth and probability.

The author proposes in the course of his work many new solutions of morphological difficulties (e.g. with regard to case and personal endings); although his arguments are usually ingenious and not rarely plausible, in part of his attempts I fear he fails to carry conviction. Dr. Kronasser has in preparing this volume utilized all recent publications on Hittite and its position in Indo-European. It cannot however be said that he has always been very successful in incorporating the newest information; the most recent opinion is not always the soundest, nor criticism always refutation. However, his work constitutes a welcome complement to Sturtevant's one-sided Comparative Grammar. Adding a few criticisms of detail we may observe that in § 174 no satisfactory distinction is made between aspect (complete or incomplete instantaneous action etc.) and 'Aktionsart' (ingressive, iterative etc.). On p. 164, n. 23 the thematic vowel ("i.e. Stammvokal") is not convincingly explained as originally belonging to disyllabic roots and becoming a formative element when it was analogically extended to monosyllabic roots; p. 172 Gr. ἐνεγκεῖν is said to contain an infix *-n-* (cf. however ὄγκος etc.); p. 173: for the 'causative' character of the *-*neu-/-nu-* verbs see e.g. L. Renou, Grammaire de la langue védique, § 319, p. 125 for the type Gr. Ἑλλαδ- see Schwyzer-Debrunner, Griechische Grammatik I, p. 507 f.; p. 126, for Gr. γυναῖ-κ-ες the same handbook I, p. 583; § 51: for the 'ancient variation' *m* : *w* compare in Dutch dialects (e.g. Flemish) *me* instead of *we* "we"; Lesb. δόμεναι and Cypr. δόϝεναι must not be quoted as an instance: see Schwyzer-

Debrunner, o.c., p. 808; p. 36, 1. 2 f. b. read 'Diphthonge' instead of 'Vokale'; p. 48, 1. 4 f. b. read **nestas*; § 82 for the supposedly 'generalizing' indefinite function of *-que* in Latin *quisque* etc. and I.E. k^ue the reader may be referred to Lingua, vol. 4, p. 241, and esp. p. 256 f.; p. 71 ff. forms such as Lat. *thensaurus*, quoted as examples of 'inverse orthography' may have actually existed in spoken language, the 'furtive' *n* being of frequent occurrence in many languages. The 'Anhang' (p. 236—256) contains useful bibliographical references.

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